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THE

NATURALIST:

A

MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND

EDITED BY

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JOHN W. TAYLOR.
WILLIAM WEST, F.L.S.

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AND
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Prof. P. F. KENDALL, M.Sc., F.G.S., JOHN W. TAYLOR,
T. H. NELSON, M.B.O.U., WILLIAM WEST, F.L.S.

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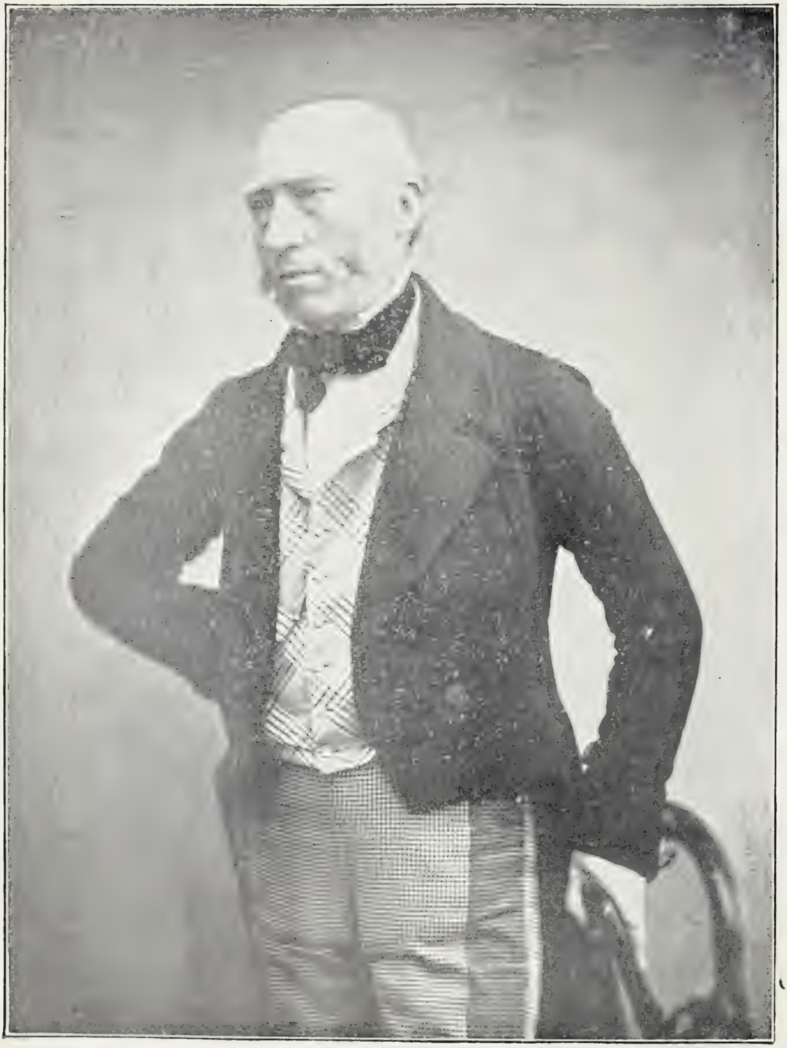

John Phillips, aged 60.

THE NATURALIST
FOR 1908.

NOTES AND COMMENTS.

JOHN PHILLIPS.

By the courtesy of the Council of the London Geological Society, we are able to give our readers a reproduction of a portrait of Professor John Phillips (Plate I.), which appears in the 'History of the Geological Society,' recently written by Mr. H. B. Woodward, F.R.S. The original photograph is in the possession of the Royal Society, and represents Phillips at the age of sixty. Quite apart from the excellent work he did on the Geological Survey, Phillips will always be remembered for his poineer work in our greatest county; his 'Geology of Yorkshire' (2 vols.), and 'Rivers, Mountains, and Sea-coast of Yorkshire' being excellent examples of what he could accomplish. Whilst he was the Curator of the Museum at York, he was largely instrumental in forming the British Association, and to his charming personality the success of its first meeting was largely due. Phillips was born in 1800, and died in 1874. In an obituary by Sir John Evans, addressed to the Geological Society, he stated that Phillips was 'eminently judicious, ever courteous, genial, and conciliatory, he gained the affection of all with whom he was brought in contact; while as a lecturer his qualifications were always of the highest order; and his knowledge, most various and profound, was communicated in a lucid and pleasant style.'

BIOLOGY AT LIVERPOOL.

The Liverpool Biological Society is again to be congratulated upon the excellence of its annual volume.* The Proceedings and Transactions for the year 1906-7, in addition to containing the report of council, a summary of the proceedings of the meetings, etc., includes some substantial memoirs of great value. Mr. C. Gordon Hewitt's monograph on 'Ligia,' and Mr. H. C. Chadwick's monograph on 'Antedon,' are particularly serviceable to students. Prof. W. A. Herdman's

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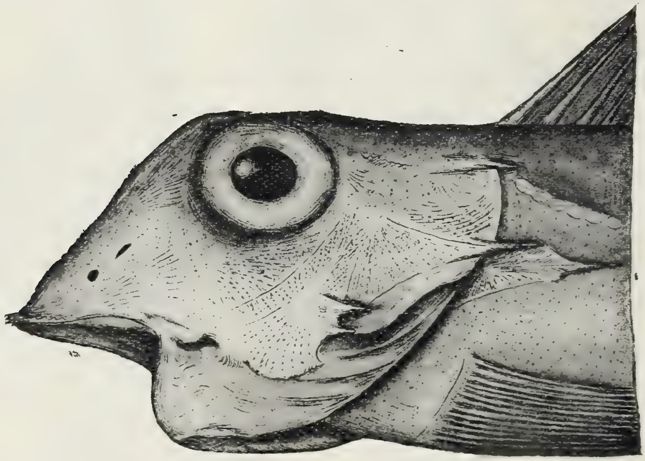
* Vol. XXI., 1907, 417 pages, plates, price 21s.

5

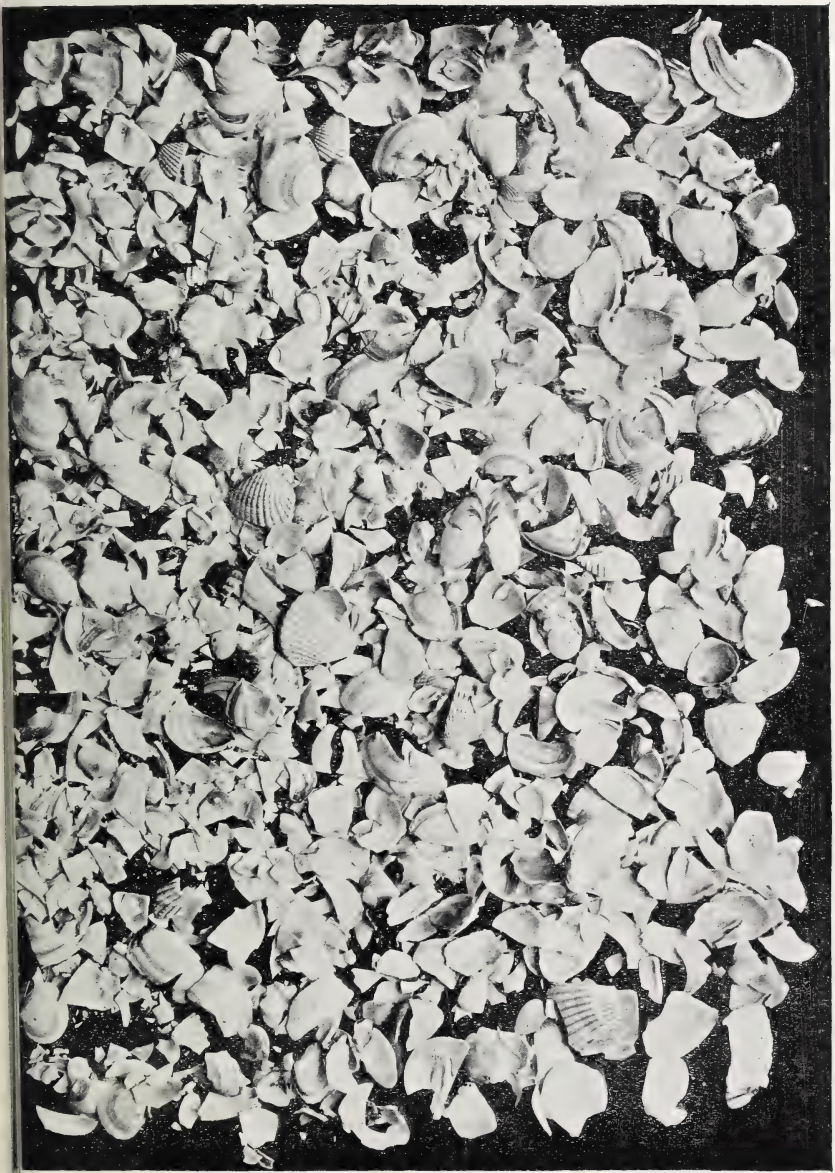
presidential address, 'Some Problems of the Sea,' is, as might be expected, a thoughtful contribution. In it he appeals for more general attention to be paid to marine zoology by teachers and others. Prof. Herdman also writes the Twentieth Report of the Marine Biological Committee, and their Station at Port Erin. And, together with Messrs. Scott and Johnstone, he gives a report on the investigations carried on during 1906 in connection with the Lancashire Sea Fishes Laboratory, at the University of Liverpool, and the Sea-Fish Hatchery at Piel, near Barrow. This last occupies 270 pages.

A MALFORMED GURNARD.

In this report are several items of interest to the naturalist. In addition to reports on Sea-Fish Hatchery, Tow-netting, Food of Young Fishes, Marked Fish Experiments, Parasites of Fishes, Bacteriological Investigations, etc., there are some useful short notes. These deal with an hermaphrodite Hake, the occurrence of *Gadus esmarkii* at Morecambe, a Gurnard with a malformed jaw, etc. As will be seen from the accompanying illustration, this last-named specimen has lost the greater portion of the lower jaw. The upper jaw overhangs the mouth, which is reduced to a small crescentric slit on the lower side of the head, and both jaws were quite immovable. Whatever food the fish obtained must have been of very small size. Nevertheless, the fish appeared to be healthy and in good condition.



Deformed Gurnard.



Contents of the stomach and intestines of a Flounder. Nat. size.

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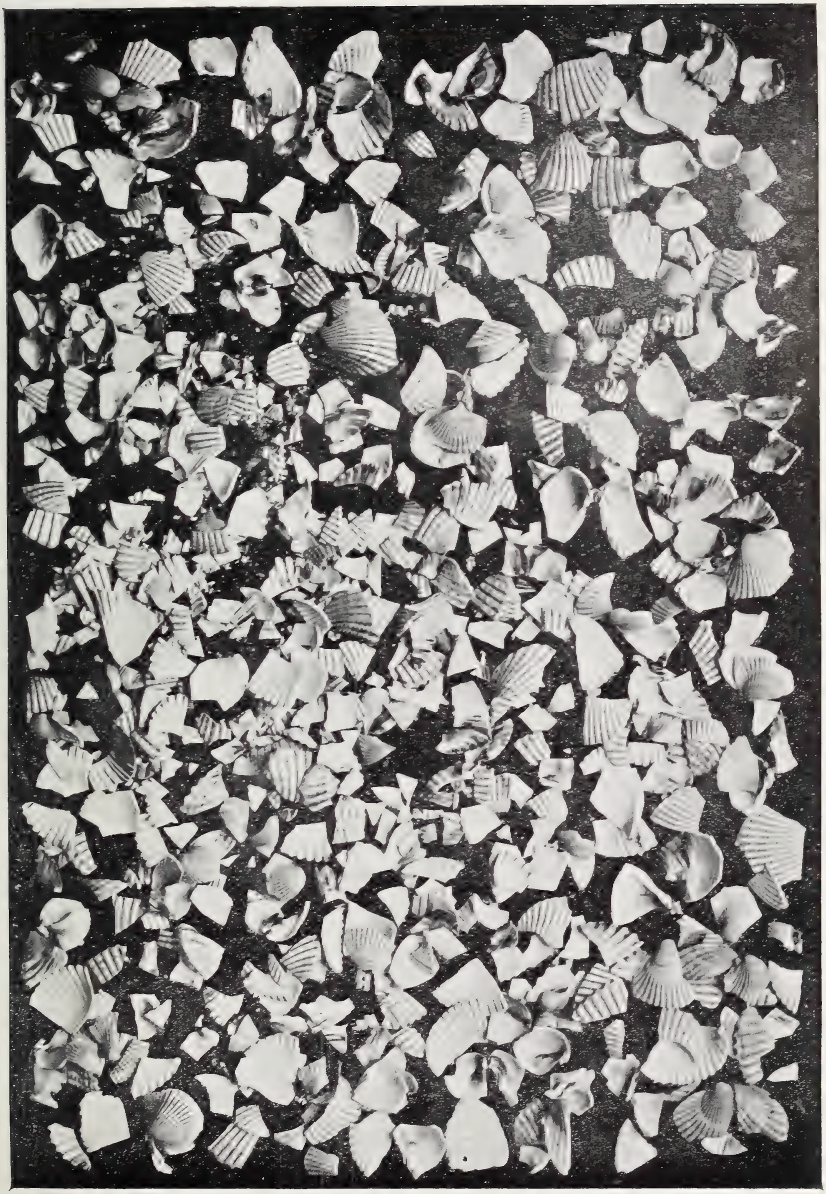

Contents of the stomach and intestines of a Plaice. Nat. size.

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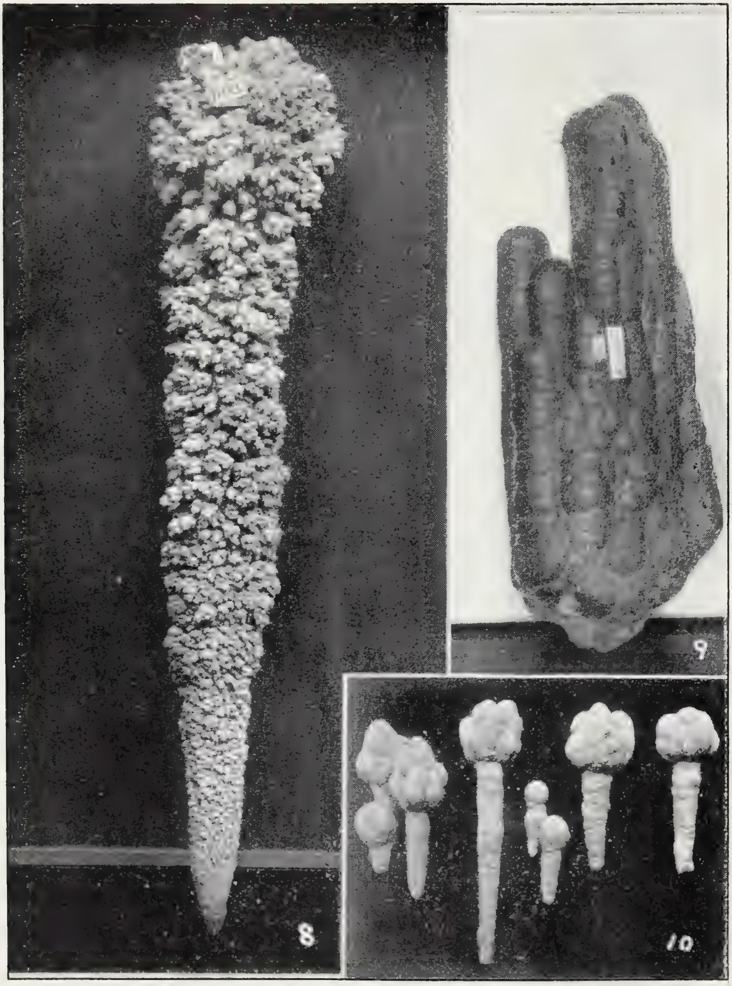

Concretions.

FOOD OF FISHES.

In the above Proceedings are also some particulars of investigations which have been made relative to the food of fishes. In a flounder, which weighed 272 grammes, caught on Baicliff sands, broken shells were found, which, when cleaned and dried, weighed 11.82 grammes. They consisted mainly of *Tellina balthica*, with a few cockles, and two *Hydrobia ulvæ* (Plate II.). In a plaice weighing 221 grammes, caught in the same locality, the food was found to consist of cockles only (Plate III.). By the kindness of the Society we are able to reproduce the illustrations accompanying the notes referred to.

SOUTH-EASTERN NATURALISTS.

The South-Eastern Union of Scientific Societies, which is modelled after the style of the Yorkshire Naturalists' Union, issues an annnal publication called the 'South-Eastern Naturalist.' The volume for 1907[*] has just been received, and in addition to a report of the proceedings of the twelfth annual congress held at Woolwich in June, has several notes and papers of interest. The presidential address of Prof. Silvanus P. Thompson is included, in which he does not agree with the oft mis-quoted sentiment :—

> A little *learning* is a dangerous thing ;
> Drink deep or taste not the Pierian spring.

He states with the utmost emphasis that the sentiment is false and misleading. There are numerous interesting papers, including 'An Experiment in Co-operative Field Botany,' by Prof. F. W. Oliver ; 'Ideals in local Geology,' by W. Whitaker, F.R.S. ; 'The Antiquity of *Equus caballus*,' by W. H. Griffin ; and 'How to make Local Societies more efficient,' by H. Norman Gray.

CONCRETIONS.

Dr. G. Abbott also returns to his favourite subject, Concretions, which he has already dealt with in these pages.[†] He classifies the various types of concretions as follows :—Rods, Hollow cylinders, Parallel bands or plates, Spheres and their modifications, Oviform masses, Cones, Mammillated or reniform, Retiform or mesh-like, and Corrugated discs. These various forms are described, and illustrated by an excellent series of plates. One of these (Plate IV.) Dr. Abbott kindly enables us to reproduce.

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[*] Elliot Stock, 64 and 94 pages, 2s. 6d.

[†] 'Naturalist,' 1905, pp. 231-233.

FLOWERS OF THE OAK.

By the permission of Messrs. Cassell & Co. we are able to give our readers an excellent illustration of the male and female flowers of the Pedunculate Oak. The oak does not commence to bear good seed until the ripe age of sixty or eighty years. 'The male and female flowers come out in the same individual, and at the same time as the leaves are emerging, namely, April or May. Both male and female inflorescences arise as branches on shoots produced during the current season. On feebler dwarf-shoots only pendant male catkins arise; but on more vigorous shoots springing from the terminal portions of the previous year's twig, both kinds of inflorescences occur. A resting bud about to produce a flowering branch is encased in pairs of scales; when it shoots out, the male inflorescences arise in the axils of a few of the uppermost of paired scales. And on the male branches the catkins can be seen before the foliage leaves are revealed.' (See Plate V.).

TREES AND THEIR LIFE HISTORIES.

The preceding remarks in reference to the flowers of the oak are taken from a beautiful book, 'Trees and their Life Histories,'* which has recently been issued. The letterpress is by Dr. Percy Groom, of the Chelsea Physic Garden, and there are no fewer than five hundred and seventeen illustrations from photographs by Mr. Henry Irving. The illustration we produce is a fair sample of them, but many are twice the size. In addition to photographs of characteristic trees in summer and winter garb, there are photographs of the trunk, branches, shoots, flowers, fruits, etc., etc. Certainly all Mr. Irving's work is very good indeed. The author gives useful information relating to each species, under the head of Behaviour and Growth, Germination, Sprouting, Branching, Production and Fertilisation of Flowers, and Protection and Dispersal of Seeds. He also deals with the manner in which trees adjust their shapes to various situations; how they protect vulnerable parts from injury by climate, weather, etc.; how they replace injured parts, and how their structure enables them to live in divers situations. In addition, the book is written in a style which will appeal to either botanist or one who has no botanical knowledge. We have pleasure in recommending it.

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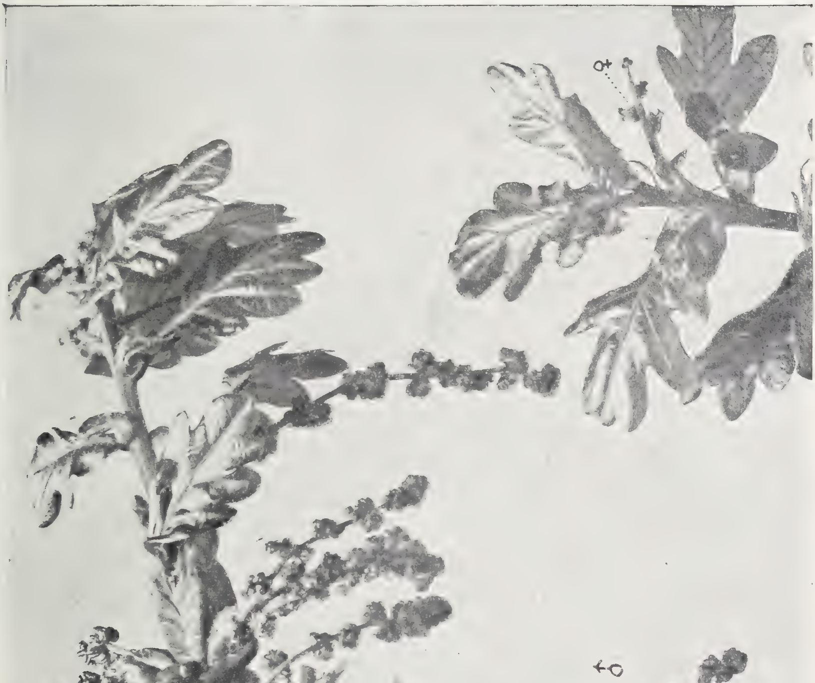
* Cassell & Co., 407 pages, price 25s. net.



Male and Female Inflorescences of Pedunculate Oak (see page 4).

BRITISH MUSEUM NATURAL HISTORY

NOTES ON BIBLIOGRAPHY, PUBLICATION AND NOMENCLATURE.

C. DAVIES SHERBORN.

MY friend Mr. Sheppard has asked me to put a few notes together on subjects with which I have to deal in my daily work in connection with Bibliography, Publication, and Nomenclature, in order to show that the confusion and difficulties which exist are by no means so easy to eliminate as many suppose.

When compiling a Bibliography of any subject it is necessary to quote the Author's name in full, using some publication of acknowledged accuracy such as the Catalogue of the Libraries of the British Museum (Natural History), compiled by Mr. B. B. Woodward. The title of the paper should be precisely that employed by the author, and should not be mutilated in any way whatsoever. The title of the Journal from which the paper is extracted should be quoted in accordance with some recognised system or authority, as *e.g.*, the lists of abbreviations employed by the Geological Record or Zoological Record ; and such abbreviation should be sufficiently full as to be intelligible alike to the layman as to the Librarian. 'P.Z.S.' for example is not enough, but 'Proc. Zool. Soc. (Lond.)' is comprehensive and intelligible to everyone. The word (Lond.) is inserted in ( ) because it does not occur in the title, and is necessary to distinguish the London publication from any other that may exist in other English-speaking lands. If the Periodical or Academy from which the Paper is extracted be issued in parts, it will be needful to quote the part-number and its date, because the date on the title-page of the completed volume may be a collective one and quite misleading as to accurate date of publication of a particular page. For this reason all Librarians bind the volumes of Periodicals and Academies with their part-wrappers in position despite the fact that they interfere somewhat with the appearance of the bound volume. Much confusion in nomenclature exists to-day from the neglect of this simple precaution by the older custodians of books, and it is often extremely difficult to obtain an original and perfect set to work from for nomenclatorial purposes. The same remarks apply to separate works which are issued in parts, and even now it is impossible to quote accurately Agassiz and Desor's French or German editions of Sowerby's 'Mineral Conchology' because all trace of the actual date of issue of the various parts is lost. Many other works are in the same condition, and large sums have been offered for many books of this kind if they could be supplied as issued. Further difficulties in dates are seen in several of the numerous editions of Buffon, whose publishers reissued various volumes with a newly dated title-page at intervals. The misdating of Periodical and Academical publications is often due to bad editing, and editors have been largely to blame in permitting authors to misdate their works in order to gain priority. A notorious example of this is a well-known book on Indian Butterflies whose author was accustomed to date his parts when he wrote his manuscript.* The parts were issued many months later, and often the author gained a year priority for his new specific names, outside the watchful eyes of those whose business it is to attend to such delinquents. A more gross case was that Seoane, who endeavoured to gain priority involving several years by a falsely dated pamphlet. When the copies of that paper reached England the printer's ink was not dry and easily smeared, but many other facts completely crushed this dishonesty.†

The question What is publication? is difficult to get agreement upon. A general concensus of opinion tends towards public sale or public distribution. The former is more satisfactory because in many cases public distribution is more or less partial from many reasons. Every publication should bear the name and address of some publisher upon it, and if possible a price. The practice of some publishers of putting a date in advance in order to say the book is up to date is one to be strongly condemned.

A famous case of 'publication' is that of Pallas' 'Zoologia Rosso-Asiatica,' 1811. The bulk of the book was printed by 1811, and some twenty copies were distributed to the chief scientific men of Europe. War stopped the progress of the work, the fishes were not engraved till 1814, and the whole was issued with new title-pages in 1831. In the British Museum (Natural History) is a copy of the first issue with original title-pages, and, with the exception of the fish, the work dates from 1811. Another interesting case is that of Martyn's 'Psyche,' 1797.‡ Of this work only ten copies were done, most of the names were manuscript written at the bottom of the plates. I had the privilege of examining three out of the ten copies at the same time when engaged on my 'Index Animalium.' I regard this book as a manuscript, for it is practically inaccessible to the bulk of workers; but the names are used by lepidopterologists.

---

* *Ann. Mag. Nat. Hist.* (6) xi., 1893, 261, etc.

† *Ann. Mag. Nat. Hist.* (6) xiv., 1894, 154.

‡ *Ann. Mag. Nat. Hist.* (7) i., 1898, 106.

Privately printed books such as Alphonse Milne Edwards' Recueil de Figures de Crustacées nouveaux ou peu connus, Part I., 44 plates, 1883, list of plates, should be quoted as [Auct. typ.] Only 50 copies were done, and distributed to fellow-workers, but a few were sold. Other cases of difficulty which arise are books in which the plates appear long before the text; in these cases I regard the names printed under the plates as *nomina nuda*, and my reasons are given at length in *Proc. Zool. Soc.*, 1896, 610, in my 'Explanation of the Plan adopted for preparing an "Index Generum et Specierum Animalium."'

With regard to questions of nomenclature, the difficulties are legion, and I am inclined to regard strict priority as the safest method of dealing with them. It causes temporary confusion, but ultimately nearly all matters will be settled. Many of these difficulties arose from ignorance of existing literature, now happily removed by the splendid work of the 'Zoological Record.' Others arise from the worker being unable to get access to such literature. Various attempts to unravel confusion and to codify names have been made by the British Association, other Societies, and numerous Congresses. The Linnean system of nomenclature, which has lasted 150 years, is the simplest. Linnæus named all animals and plants binominally. He gave a genus name and a trivial name, the two together making the specific name. Thus, *Ostrea lima*, Linnæus. A later author, Lamarck, recognising that this species was not a true *Ostrea*, changed the name to *Lima*, and the specific name became *Lima lima* (Linnæus), Lamarck, *Mem. Soc. Hist. Nat. Paris*, 1779, 88, and *Ostrea lima,* Linnæus was properly quoted in the synonymy to show the origin of the term. To this Linnæus and later authors added the word *varietas*, but recent authors have dropped this word and merely quote the formula *Lima lima guadeloupensis*, and so on. You may possibly have a quotation which gives the genus, subgenus, trivial, subtrivial, geographical or mutational name. A source of further difficulty is the non-examination of the original type or description. For instance the well-known *Mus musculus* of Linnæus, which after standing for 150 years as the name of the common house-mouse, has lately been questioned. It is interesting to note that this was the very species quoted by me in 1899 in my 'Index to the tenth and twelfth editions of Linnæus' Systema Naturæ,' which I may be allowed to quote, as it contains matters pertinent to our subject. I wrote, 'In spite of the difficulties, and they are many, I am of the opinion that a rigid adherence to the law of priority, would eventually lead to a great simplification of nomenclature, but the impossibility of determining what an author means when he refers to a genus and species founded by an earlier author, allows one to regard with respect the views of those who think priority tempered with common sense the better method. Briefly it amounts to this: an author says he has a specimen of *Mus musculus* Linnæus. In the first place we ask does the author know what Linnæus meant by *Mus musculus*? In the second, is the author competent to judge that he has that identical species? The question, therefore, must always be one of personal idiosyncracy, and finally is practically impossible.' A further difficulty is the spelling of generic names, *Olopus* or *Holopus*, *Cheirotherium* or *Chirotherium*, *Kokkoksteus* or *Coccosteus*, according to the nationality or otherwise of the person using the words compounded from classical languages. A good example of this kind of thing is seen in *Cœlogenus*, which has been written *Coelogenys*, *Cælogenus*, *Cælogenys*, *Cælogonus*, and *Caelogenys*.

Herrera points out that of ninety-five authors who have written on *Alauda cristata*, this bird has been put alternately into *Alauda* or *Galerita* by almost each successive writer.* If generic diagnoses are any good at all, the bird must be either an *Alauda* or a *Galerita*, but many diagnoses are so vague that confusion exists even there. Only the other day I was asked to advise on the diagnostic characters of a fossil Pterosaur, and on looking up the matter found that the author in his first paper said the genus had 'no teeth anterior to the palate,' and in his second that 'the teeth are prolonged anterior to the muzzle.'

Other difficulties arise from those ingenious wits who make fictitious names. *Botheratiotherium* and *Unclesambocrinus* may be intelligible to an English-speaking person, but what of a Japanese, Russian, or Greek, who is trying in vain to unravel a difficulty and comes upon them. A well-known South American palæontologist in despair at inventing the number of generic terms he required for his discoveries, has perpetrated such atrocities as *Arturosmithwoodwardia* and *Ricardolydekkeria.* Others more fanciful in their tastes have objected to words like *Orchis* or *Callopyge* as indelicate, but Linnæus seemed quite Chaucerian when dealing with his genera *Venus* and *Priapus.*

---

* *Nat. Sci.*, Jan. 1896, 6.

Authors themselves often confuse the issue as did Laxmann, who in 1769 refers a half-rat half-mole like animal to *Myospalax.* But in 1773 the same author uses the word specifically when he refers to the same animal as *Mus myospalax.*

I will bring these remarks to a close by telling the curious story of the name of the Wild Turkey of the Eastern United States. This bird was quoted as *Meleagris fera*, Vieillot. An English ornithologist ventured to point out that the name *fera* was incorrect, as the word on the page of the work cited read *silvestris*, and the proper name of the bird must therefore be *Meleagris silvestris.* Soon after appeared an angry letter almost questioning the sanity of the Englishman, for several people had looked at the book in question and the word was most certainly *fera.* I was appealed to to unravel the mystery and I found that both the parties were right; in one copy of the book was the word *fera* and in the other the word *silvestris.* But a careful examination of the matter showed that while the Englishman was using the original issue of the work, the Americans were using another and later issue, which differed from the first only in the insertion of a single line and the change at the time of the addition of the single word *silvestris* into *fera.* Thus peace was restored between the two countries, and a severe shock administered to those who lightly fancy that two works of some thirty-six volumes are necessarily alike. In this case one word was changed in part of the issue of volume nine, and the signature was the only evidence of a cancelled leaf and replacement.

◆

Mr. T. W. Sanders is the author of 'One and All' Garden Book No. 14, which deals with 'Climbers.' It is exceptionally well illustrated, and is sold at one penny.

A conference of northern Museum Curators was held at Salford recently. Mr. B. H. Mullen, the Curator, referred to the recent developments in the Salford Museum; Mr. G. A. Dunlop (Warrington) described a method of preparation of botanical specimens; Mr. H. Murray (Manchester) read some notes on wet methods of preserving plants for exhibition; and Mr. E. E. Lowe (Leicester) read a paper entitled 'What should be the Curator's Ideal'?

POTAMOGETON PENSYLVANICUS IN ENGLAND.

A BENNETT, F.L.S.
Croydon.

In November Dr. C. C. Vigurs, of Newquay, Cornwall, sent me some specimens to look over, gathered by his sister, Miss A. Vigurs, in Yorkshire. My surprise was great when I found among them three sheets of the above Pondweed, a well-known one of North America. Dr. Vigurs wrote, 'the Pondweed I can make nothing of.' I at once wrote to Dr. Vigurs, telling him it was new to England, but reserving the name and country. 'I asked if it was near a mill, etc.' He replied, 'Miss A. E. Vigurs gathered the *Potamogeton* herself (having no previous knowledge or information about it) on July 4th, 1907. It was growing in the canal at Salterhebble Bridge, near Halifax, just where the effluent from a cotton spinning mill enters the canal. The canal is cleaner here than elsewhere, and the vegetation more luxuriant. It is (here) five to six feet deep; *Potamogeton crispus*, *Elodea*, a *Ceratophyllum*, *Glyceria aquatica*, and *Alisma plantago* were growing with or near it. The only *Potamogetons* recorded in Crump and Crossland's 'Flora of Halifax' are *crispus*, *natans*, *obtusifolius*, *pusillus*, and *pectinatus*, Miss Vigurs in litt.

The history of this species in North America is one of many names. The earlier American authors called it *P. heterophyllus*. Dr. Gavin Watson, 1841! Rugel (who collected largely in the southern States), *P. fluitans* Auct Am., Carolina, 1842! these specimens are the oldest I know in Europe except one in the Delessert Herbarium at Geneva gathered by Rafinesque named *P. fluitans*, but with no date. He wrote on the North American species in 1808, 1811, and 1817, and the specimen will probably be between these dates. It was not till Prof. Tuckerman took up the study of the genus that anything like order was evolved among them. He gave a long description of the species, naming it *P. Claytonii* (after Clayton, who lived in the time of Linnæus). So it remained for many years, until the year 1885, when Dr. Eichler, of Berlin, kindly sent me the *Potamogetons* of Wildenow's herbarium. Here I find under No. 3192 three specimens of Tuckerman's plant named *P. pensylvanicus*, with a note by Tuckerman, 'Spec tria superioria pertinet *P. Claytonii*, *C. Tucerman* E.T.' The description of this was in Linnæa II.

(1827), p. 227. But there was another claimant, *P. pumilus* Wolfgang. in Roemer's and Schultes Sys. Mant. 3 (1827) 354. Of this Dr. Lange, of Copenhagen, sent me an original specimen; this, too, was *Claytonii.*

Then Rafinesque, in Medical Repository 2nd Hex 5 (1808), p. 354, named a species *P. epihydrum* (giving as a syn) '*P. natans* var. 6 Michaux.' Now in the Vienna Herbarium there is a specimen named '*P. natans* Michx., In fluv. Virginia-Beyruth,' and this specimen is also *P. Claytonii.* But there is still another name accepted by Dr. Morung* and by Dr. Graebner,† *P. Nuttalii Cham et Sch.*, in the same volume of Linnæa, but on the page before *pensylvanicus.* The outcome of all these names is that the Linnæa was published in 1827, before the volume of Roemer and Schultes, so that disposes of *pumilus;* that we have specimens of *pensylvanicus*, but none of *epihydrum* or *Nuttalii*. Personally, there seem so many mistakes with the genus that I trust to specimens alone, and would prefer to call it *P. pensylvanicus*, at least until evidence more conclusive is brought forward on behalf of the other names, although there seems to be fair reason for supposing that Rafinesque's name may have to be accepted.

In North America the species is found in Vancouver's Island, British Columbia! Upper and Lower Canada! Nova Scotia! and in the United States from Maine (Fernald!) to Georgia! New York to Washington Territory! and California! occuring in twenty-seven of the states and territories; in Jamaica! and Porto Rico! It varies as var. *portoricensis* Graebner (slender form) to a very large form var. *Cayugensis* Wiegand.

As to its introduction to our country, I prefer to leave this an open question until I hear from Mr. Fernald of the Gray Herbarium, U.S.A., and hope to contribute a further note on the subject.

I have written to Mr. Crump respecting it, giving him a few notes, and I hope next summer some botanist will explore the canal and give a full list of all its phanerogamic vegetation. It is the first authenticated example of a *Potamogeton* being introduced that I know of, though Dr. Morung considered *P. crispus* L. was in America, but that has proved not to be the case. I possess in my collection forty-two specimens of the species from all over its area of distribution.

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* N. American Naidaceae, t. 29 (1894), p. 18. † Das Pflanzenreich Heft. 31 (1907), p. 133, 141.

COLEOPTERA IN YORKSHIRE, 1907.

E. G. BAYFORD,
Barnsley.

THE prevailing weather during the year was of such a character as to make it very unfavourable for collecting, reports from workers in different parts of the county agreeing that the lack of species, usually common, has been *the* feature of the year.

The various excursions of the Yorkshire Naturalists' Union have been attended by one or more representatives of the Yorkshire Coleoptera Committee, and the results of their work published in the 'Naturalist.' Similarly other important captures, such as that of further specimens of the recently re-introduced species *Carpophilus sexpustulatus* F., by Dr. Corbett have also been published in the same medium, and need not now be more than referred to.

From the Scarborough district the Rev. W. C. Hey, M.A., reports that '*Longicorns*, as a rule associated with hot, sunny weather, were unusually abundant in Forge Valley. On some days nearly every flower-head of cow-parnsip was infested by *Grammoptera tabacicolor* De G. It was accompanied by a few examples of the darker species, *G. ruficornis* F. Two very conspicuous *Longicorns* were noticed in the wood, *Toxotus meridianus* L. and *Rhagium inquisitor* F. I had not seen either of these insects in Forge Valley before this summer. One evening my house-keeper called me to see a number of insects flying to the lamps. They proved to be *Trypodendron domesticum* L. They had no doubt flown out of a log of birch wood from Forge Valley, which was drying before the kitchen fire. *Chrysomela varians* Schal. has been abundant on *Hypericum* in Forge Valley.'

From the Doncaster district Dr. Corbett reports that, from a collector's point of view, the past season has been the worst he has experienced, 'The continued cold wet weather throughout the summer months prevented anything being done with the flower and leaf-frequenting species, hence the poor list of *Phytophaga* and *Curculionidæ.* Aquatic species have been scarce also, only the commonest kinds being obtainable. On the contrary, bark, fungus, and dung frequenters have been fairly common, and amongst these some species hitherto scarce have been very abundant. One feature of the season has been the comparative scarcity of *Coccinellidæ.* This may in some measure account for the countless swarms of *Aphides* during the fine weather in September.' Since this was written swarms of *Coccinellidæ* have succeeded the swarms of *Aphides*, the one probably being a natural sequence of the other. Not since 1884 have the two commonest species of Lady-birds, *Adalia bipunctata* L. and *Coccinella decem-punctata* L., been so abundant. The following is a list of the more important species observed during the year, to which are added a few words on other species which call for notice.

* is prefixed to such species as have not previously been recorded for the Riding from which they are now recorded.

† is prefixed to such species as have not previously been recorded from Yorkshire.

Stenolophus elegans Dej. This species must be deleted. The specimen so recorded has been wrongly determined. It is
† *Acupalpus exiguus* Dej. var. *luridus* Dej. The character used to separate Acupalpus from Stenolophus is apparently a somewhat variable one, for the single example of this species taken at Thorne Moor is a male. Both the anterior and intermediate tarsi are dilated, and have their penultimate joints deeply bilobed, in all which particulars they agree with the characters laid down for Stenolophus.
* *Amara communis* Panz. One at Flamborough (T. S.).
* *Anchomenus gracilis* Gyll. Taken commonly at Hornsea Mere (T. S.).
,, *piceus* L. Still occurs at Hornsea Mere, one being taken there in 1907 (T. S.).
* *Bembidium obliquum* Sturm. A few of this local and rare species were taken at Pool, near Otley (E. W. M.).
* *Trechus micros* Herbst. One in Roundhay Park, Leeds (E. W. M.).
* *Rhantus grapii* Gyll. Taken commonly at Thorne (H. H. C.).
* *Octhebius bicolon* Germ. Abundant on Sandall brickfields (H. H. C.).
* *Bolitobius exoletus* Er. In fungi, Sutton in Holderness (T. S.).
Mycetoporus clavicornis var. *forticornis* Fow. Saltburn (M. L. T.).
Staphylinus pubescens De G. Near Doncaster (Vincent Corbett).
* *Xantholinus ochraceus* Gyll. Rossington
Coryphium angusticolle Steph. Warmsworth (H. H. C.).
Bythinus puncticollis Derny. Sandall Beat
† *Rybaxis sanguinea* L. Under dead reeds on banks of Hornsea Mere (T.S.).
Euplectus sanguineus Derny. Saltburn (M. L. T.).
† *Trichopteryx anthracinus* Matth. Bessacar, nr. Doncaster
† *Olibrus aeneus* F. Thorne Moor
† *Stilbus testaceus* Panz. Taken commonly in the Doncaster district
Mycetea hirta Marsh. Cusworth
Hister bimaculatus L. Doncaster
* *Abracus globosus* Hoff. Cusworth
† *Micropeplus tesserula* Curt. Sandall Beat
Omosita colon L. Rossington
Rhizophagus bipustulata F. Warmsworth (H. H. C.).
† *Monotoma quadricollis* Aube. Rossington
† *Lathridius bergrothi* Reitter. Doncaster
* *Cartodere ruficollis* Marsh. Extremely abundant, Edlington Woods and Cudworth
* *Corticaria fulva* Coms. Doncaster
Silvanus surinamensis L. Abundant in a corn warehouse,
Cryptophagus cellaris Scop. Doncaster
* *Ephistemus globosus* Waltl. Rossington

* *Litargus bifasciatus* F. A specimen of this rare insect was taken under bark at Cottingham about six years ago by Mr. Stainforth. Its identity was established in time for the record to appear in the 'Victoria History of Yorkshire,' but it seems advisable to record it here also. It has also been taken by Dr. Corbett in Wheatley Wood. These are the most northerly records for this species.

Tiresias serra F. Cusworth (H. H. C.).
Aspidiphorus orbiculatus Gyll. Near Whitby (M. L. T.).
Parnus auriculatus Panz. Rossington (H. H. C.).
Geotrupes typhæus L. Rossington (Vincent Corbett).
Lacon murinus L. Two at North Cave (T. S.).
† *Anobium fulvicorne* Sturm. Cusworth
† *Cis hispidus* Payk. Edlington Wood (H. H. C.).
,, *bidentatus* Ol. Thorne Moor
† *Callidium variabile* L. Several in an incompleted house in Hull. Undoubtedly imported in the timber (T. S.).
† *Grammoptera analis* Panz. One at Pool, Otley (E. W. M.).
Donacia discolor Panz. Near Whitby, and Stanghow Moor near Saltburn (M. L. T.).
Cassida flaveola Thunb. Kildale in Cleveland.
Tetratoma fungorum F. Wheatley Wood (H. H. C.).
† *Hallomenus humeralis* Panz. Cusworth
† *Salpingus aeratus* Muls. Saltburn and Stanghow Moor (M. L. T.).
Rhinosimus ruficollis L. Wheatley Wood (H. H. C.).
† *Mordellistena pumila* Gyll. One by sweeping, South Cave (T. S.). Several taken by Dr. Corbett in Wheatley Wood. These are the most northerly known records for this species.
Trachyphloeus alternans Gyll. Saltburn (M. L. T.).
Barynotus elevatus Marsh. Roundhay Park, Leeds (E. W. M.).
† *Dryocaetes alni* Georg.

The initials attached to the various records are those of H. H. Corbett, M.R.C.S., E. W. Morse, T. Stainforth, and M. L. Thompson, F.E.S. It will be seen from the above list that notwithstanding the generally disappointing weather experienced during the year, the results are by no means discouraging. To be able to record sixteen additions to the county list, and an extended distribution of thirteen others, is both satisfactory and stimulating.

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Part XI. of the new series of the **Bradford Antiquary**, the journal of the Bradford Historical and Antiquarian Society, has been issued under the able editorship of Prof. Federer. As a frontispiece is a portrait of the late Wm. Cudworth, which is accompanied by an appreciative notice of his work, by the editor. There is also a bibliography of Cudworth's publications, from which, however, an interesting item is omitted. This was a note on 'Carboniferous Vegetation at Bradford,' and appeared in this journal for July, 1903. A paper by the Bradford City Librarian, Mr. Butler Wood, is on 'The Bradford Newspaper press.' From the early issues of some of the Bradford papers Mr. Wood gives some curious quotations. Mr. H. F. Killick writes on the 'Duchy of Lancaster and the Manor of Bradford'; Prof. Federer deals with the 'West Riding Cartulary'; Mr. W. Scruton has an article on 'Baildon, Ancient and Modern'; Mr. T. T. Empson gives extracts from the Burial Register of Bradford Parish Church; and the Editor has a paper on 'Robin Hood, Myth or History.' The Bradford Antiquaries are to be congratulated on their publication, which, it is hoped, may continue for some time to come. The great value of the papers printed is their local character.

SPHAGNUM BAVARICUM IN YORKSHIRE.

W. BELLERBY,
York.

DURING the month of August, 1907, whilst collecting Sphagna in the boggy district near Ellerbeck (v.c. 62), I found several interesting species (which, at his request, I sent to Dr. Warnstorf of Berlin), among which a very interesting plant, recently named, was found, viz., *Sphagnum bavaricum* Warnst. Dr. Warnstorf has described it fully in 'Hedwigia' (xlvii. p. 84, 1907), and the editor of this scientific journal has kindly forwarded me the part containing the original text (together with that of other thirty-seven rare new European and exotic Sphagna), from which I am enabled to give the following translation from the German, which will be of interest to Sphagnologists of Yorkshire.

SPHAGNUM BAVARICUM, WARNST.—*Hygrophyte!* Resembling strong forms of *S. subsecundum* and *S. rufescens*, in cushions 20-25 c.m. high in their upper part, glaucous to brownish-green in colour. The stem cuticle is of one layer of cells, the central cylinder eonsists of three layers of lignified cells, first pale or green, later yellow or yellowish-brown, and generally these cells are narrow and strongly collenchymatous, while the rest of the ground tissue of the stem is faintly collenchymatous. Stem leaves small triangular lingulate 0·8-1 mm. long and 0·7-1 mm. broad at the base, and here often broader than long; in the upper part and on the broad obtuse apex they have a hyaline border, and the margin fringed by the resorption on both sides of the cell membrane. Margin incurved and *not wider below* than above. Hyaline cells rather narrow, bottle-shaped and much divided, in the apex shorter, wider and more divided and almost without fibrils, and *both sides without pores*, often with fibril-beginnings in the apex, sometimes in the middle and further down richly fibrose, and then on the inner surface of the lamina with numerous small to medium-sized ringless pores at the commisures, in the middle wall between the fibrils always weak in pores.

Branch leaves mostly in fours; two stronger with round acuminate leaves swollen, and with incurved branches in the capitula, the two others weak and pendant.

Leaves of the spreading branches variable in size and form, elongate or roundish ovate 1·14 mm.-2·6 mm. long, 0·8-1·5 mm. broad, very concave by the broad incurving of the margin right down to the base, often unsymmetrical; in the narrow blunt apex almost cucullate and faintly toothed. Hyaline cells of numerous fibrose bands, and on the leaf surfaces with exceedingly numerous rows of very small pores in the commisures, and those of the inner surface are for the most part pseudo-pores.

Chlorophyll cells in cross-section triangular to trapezoidal (barrel-shaped according to Röll), emerging from the inner surface or free on both sides, but the broad outer wall is always on the dorsal surface.

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Mrs. Walker and her son, Mr. Gelson Walker, have presented the valuable collection of fossil brachiopoda formed by the late J. F. Walker, of York, to the British Museum.

An exhaustive article dealing with Iona Marble appears in 'The Quarry' for December. It is accompanied by a beautiful representation of the marble, reproduced by the three-coloured process.

The North Lonsdale Field Club, formed in April last, has already over a hundred members, and appears to be very enthusiastic in its work. Our contributor, Mr. S. L. Petty, of Ulverston, is the President.

Under the name of *Massaria theicola* Petch., our contributor, Mr. T. Petch, B.A., B.Sc., describes 'A Stem Disease of Tea' in Vol. IV., No. 4 of the circulars issued by the Royal Botanical Gardens Ceylon.

Through relying upon a newspaper notice, in a note on page 413 of our December issue, we erroneously attributed to the late John Farrah the authorship of the 'Flora of Nidderdale' in Speight's 'Nidderdale.' This was written by Dr. F. A. Lees.

Amongst the many valuable notes in the recently issued Journal of the Quekett Microscopical Club, the following are of particular interest to our readers:—'Notes on Pseudoscorpions, British and Foreign,' by E. Ellingsen; 'Three Water-mites new to Britain,' by G. P. Deeley; and 'Some British Spiders taken in 1907,' by F. P. Smith.

In the December 'Geological Magazine,' Dr. Henry Woodward, F.R.S., has some 'Further Notes on the Arthropoda of the Coal-Measures.' In these he figures and describes a number of interesting specimens from the well-known locality at Sparth Bottoms, which are new to science:—*Bellinurus Baldwini*, H. Woodw.; *B. longicaudatus,* H. Woodw.; *Eoscorpius* (*Mazonia*) *Wardingleyi*, H. Woodw.; and *Geralinura Sutcliffei*, H. Woodw.

We regret to learn of the death, early in December, of Robert Gilchrist, of Scarborough, at the age of forty-three. He was a good 'all round' naturalist, and paid particular attention to botany, geology, and the arachnida. In recent years, as a result of the Fungus Forays of the Yorkshire Naturalists' Union, he gave much time to mycology. He took a prominent part in connection with the work of the Scarborough Field Naturalists' Society, of which he was twice the president.

With reference to the record of *Deleaster dichrous* Grav. which appeared on page 353 of our October issue, Mr. J. W. Carter, of Bradford writes:—'Mr. Bayford has evidently overlooked the fact that this species has previously been recorded for the West Riding of Yorkshire. I had the pleasure of taking six or seven specimens, all under one stone, in the bed of the Greta, at Burton-in-Lonsdale, on the 23rd of May, 1903. Mine too, I find, were all of the variety *leachii* Curt.' (see the 'Victoria County Hist.').

EXTRAORDINARY IMMIGRATIONS OF REDWINGS IN THE WEST RIDING.

HARRY B. BOOTH, M.B.O.U.
Shipley.

A YEAR ago we had more Redwings in this district, and passing over it, than had been noticed for several years. But this year the numbers have increased to such an extent as to exceed all previous records, at least during the past twenty years to my knowledge.

The first few Redwings were seen in this district this season on Oct. 6th ; they had perceptibly increased by the 13th Oct., were numerous by the end of that month, and abundant during the first week in November. But the numbers to be seen in the daytime were trifling compared with those that passed overhead almost nightly after the 14th of October. From that date until the 18th of Oct. their cries were heard nightly in some numbers. From the 18th to the end of the month they were noticed almost every night by one or another of my ornithological friends, but evidently only in small flocks, excepting on the 27th, when I listened to one continuous flock passing near to my house from 11 p.m. until 11-20 p.m., and several friends heard them during the same evening. It was a dark fine night, with practically no wind.

But the largest numbers evidently passed over this district early in November, and particularly during the night of the 4th of that month. On that evening Mr. Riley Fortune lectured before the members of the Bradford Natural History and Microscopical Society. After the lecture the members, going out into the suburbs or surrounding country, heard the cries or calls of Redwings in almost every direction. Immediately I got outside Shipley railway station at 10-10 p.m. their cries above were distinctly audible, and they did not cease until 10-35 p.m., when after listening in vain for a few minutes I went home. Once, at about 10-30 p.m., I heard what I took to be the note of the Fieldfare. Mr. N. N. Lee listened to the Redwings at Heaton about the same time, and Mr. Rosse Butterfield frequently heard their calls on his way home between Allerton and Wilsden from 10 to 10-30 p.m., and he had heard them almost nightly for the previous two or three weeks. Mr. T. Roose, who had to walk from Ilkley to Bolton Abbey (about six miles), continually heard flocks passing overhead all the way—from about 10-30 p.m. until midnight. Others were calling in the air the following night, and again just before daybreak the following morning at Bolton Abbey.

When Mr. Fortune arrived at Harrogate just after midnight numbers were overhead, and he listened to their calls for about fifteen minutes. Before retiring at 1 p.m. they were still calling, and at 6-30 a.m. when he first went out he could still hear a few, but could not see them. Mr. W. Wilson had heard them at Skipton on the same evening, and also on the evening before. What enormous numbers of these birds must have been on the move over this district during the darkness of that night!

After the night of the 5th of November very few have been heard, so far as I know. During the whole of this immigration the prevailing winds have been westerly, although very light, and the greatest numbers of Redwings appear to have passed on clear dark nights.

There is one rather singular feature of the nocturnal movements of the Redwing which I have noticed in this neighbourhood. Whilst most species of birds which migrate at night appear to adopt a level line of altitude, so that they are frequently heard by persons who live on hills or in elevated neighbourhoods, and very rarely by those who reside in the valleys, the Redwings appear to fly at a certain elevation above the ground, and are heard equally well in the valleys. Thus, for instance, those passing over the lower parts of Shipley (about 200 feet above sea level) do not appear by their calls to be higher above the listener than those which are heard from the surrounding hills at several hundreds of feet greater altitude.

Since the above was written it is evident that the vast majority of these Redwings simply passed through the district. Since the middle of November we have not had more than our usual complement of Redwings, and not quite so many as a year ago.

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We have received No. 4 of the Bradford Botanical Garden handbook. It is 'A History and a Guide to the Garden,' and is sold at one penny. Reference is made to a Botanical Garden at Bierley Hall, near Bradford, over two centuries ago. There is also an excellent plan of the present gardens.

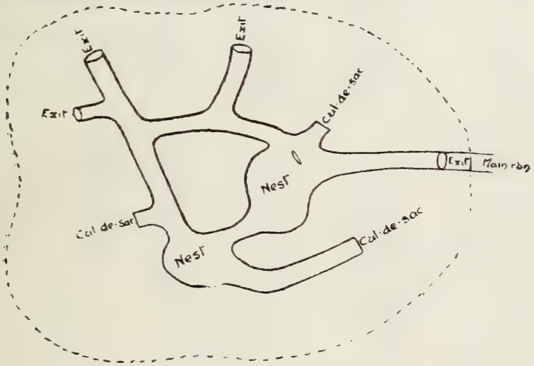
We regret to record the death of Mr. Walton Brown, of Newcastle, a well-known figure in mining circles. He was fifty-two years of age, and was secretary of the North of England Mining Institute. and other similiar Associations. He accomplished good work in connection with editing various mining publications, notably the large and valuable volumes containing the details of the borings in Northumberland and Durham.

THE ORKNEY VOLE AND ITS PARASITES.

G. A. DUNLOP,
Warrington.

During the past summer five specimens of the new British mammal, the Orkney Vole, *Microtus orcadensis* Millais., have been added to the collection in the Warrington Museum. The animals were captured on the Loans, Stromness, by Mr. George Ellison of Liverpool, and presented by him to the Museum. What is still more interesting was the capture, also in the same runs with the Voles, of two Lesser Shrews, *Sorex minutus.* The identification of the Shrews has been confirmed by Mr. T. A. Coward, who remarks upon their unusually large size.

Millais,* quoting from Harvie-Brown,† who again was quoting from Baikie and Heddle,‡ states that the Lesser Shrew is unknown in Orkney, and the Common Shrew found in a few places. W. Eagle Clarke § says, 'I make bold, however, to say that I very much doubt if the Common Shrew has ever been captured in Orkneys.' He has caught and received many Lesser Shrews from Orkneys, but not a single Common Shrew. Mr. Ellison's captures go to confirm W. E. Clarke's observations. It is to be regretted that no reliable dimensions of the Shrews were taken in the flesh, as the skins shew signs of stretching, and consequently are useless for scientific measurement. But their large size might easily at first lead one to suppose they belonged to the Common Shrew.



The dotted lines represent base of mound

PLAN OF ORKNEY VOLE'S NEST

Mr. Ellison also brought back with him no fewer than 118 specimens of fleas taken from the captured Voles. These have been identified by the Hon. N. C. Rothschild as *Ctenophthalmus agyrtes* Heller., *Ceratophyllus penicilliger* Grubé., *Hystrichopsylla talpae* Curt. Including another species, *Ceratophyllus gallinae*, captured in the previous year, this raises the number of fleas taken on the Vole to four. I believe a fifth species has been taken, but as I have not seen it I do not include it here.

The giant flea, *Hystrichopsylla talpae*, is usually associated with the Mole, after which animal it is named, but the capture of six specimens upon the Orkney Vole adds another host to the list upon which the parasite occurs. It has previously been taken from the Common Shrew, Long-tailed Field Mouse, Bank Vole, Stoat, Weasel, and Mole.

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The Royal Society has awarded the Royal Medal to Dr. Ramsay A. Traquair for his researches relating to Fossil Fishes.

We have had our attention drawn to the circular issued by a dealer, who for a guarantee of £15 will supply the following specimens, collected at St. Kilda :—

	Adult.	Nest-Feathered.	Nestlings.
Gannets	2	1	1
Cormorant	2	1	3
Shag	2	1	3
Fulmer Petrel	2	1	2
Fork-tailed Petrel	2	1	1
Manx Shearwater	2	1	1
Puffin	2	1	2
Razorbill	2	1	2
Guillemott [sic]	2	1	2
Black Guillemott [sic]	2	1	1
Ringed Guillemot	1	—	—
Great Black-Backed Gull ...	2	1	2
Lesser ,, ,, ,, ...	2	1	2
Herring Gull	2	2	2
Common Gull	2	1	2
Kittywake	2	2	2
Black-Headed Gull	2	1	2
Common Tern	2	1	—
Lesser ,, ...	2	1	—
Eider ,, ...	2	1	4
Oyster Catcher	2	1	—
Royston Crow	2	—	—
St. Kilda Wren	1	—	—
Rock Pipit	2	1	—
Wheatear	2	1	—

There is also the following note :—'Such other specimens as may be collected, in addition to the specified series guaranteed above, will be divided amongst the subscribers. A clutch of eggs will be sent with each series of *Sea Fowl.*' Thus each subscriber receives a guaranteed series of over 100 specimens, as well as eggs, and if there are ten subscribers it means that considerably over a thousand specimens will leave St. Kilda.

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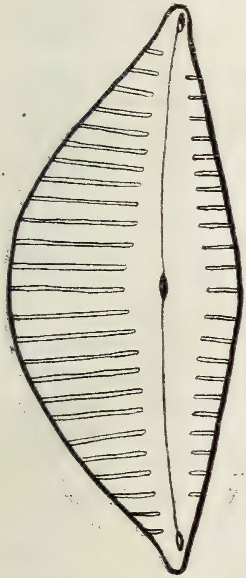
* Mamm. Great Brit. and Ireland, Vol. I., pp. 143, 152.
† Faun. Orkney Islands, p. 64.
‡ Historia Naturalis Orcadensis, 1848.
§ Ann. Scot. Nat. His., 1905, p. 7.

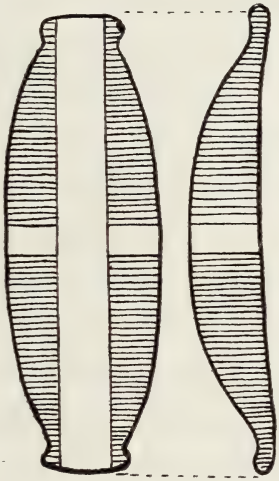
INTERESTING DIATOMS IN WHARFEDALE.

R. H. PHILIP.
Hull.

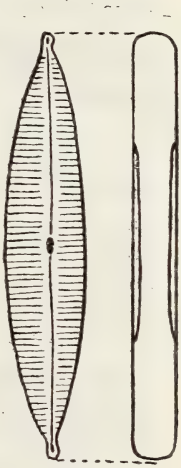
It was the last day of the Fungus Foray of the Yorkshire Naturalists' Union, held at Grassington. The work of the meeting was practically over, save that two or three of our leaders were busy with their microscopes over the last few identifications. To add to their labours at this stage by fresh collections would have been positively unkind, so I proposed to a friend to take an irresponsible walk without any object whatever but the fresh air and scenery. So, through the glorious sunshine of a bright autumn morning, we walked out from Grassington to the picturesque village of Conistone—distinguished from all other Conistons by the addition 'in Wharfedale.' It lies rather high above the Wharfe and close to the foot of the hills forming the eastern side of the valley. Not a hundred yards from the middle of the village we spied a tempting gap in the hills, and making for it, found ourselves in a veritable, if rather diminutive canon, the walls of which clad with vegetation towered above our heads. Our pathway was



Cymbella leptoceras.



Amphora normannii.



Cymbella microcephala.

the dry bed of what had once been a mountain torrent of some considerable size. It sides were rounded by water action, and in places hollowed rocks showed vestiges of pot-hole formation. Possibly in winter there may be some water in it still, as there were not many plants growing in the very bottom; but ragwort, toadflax, thistles and grass covered the sides, so the days of its strength must be long past. Winding our way up its picturesque serpentine course, we emerged at last in an upland valley, remote and wild, with nothing but bare hills all round us, and no sign of man or man's handiwork anywhere in sight, except only a tank for watering the sheep. And here we found all that was left of the once mighty spring that had excavated the deep cutting through which we had passed, fallen from its high estate and equal only to providing sufficient water to fill a sheep tank. Observing on the sides of the tank some brownish-coloured lumps of jelly, I bottled two or three of them, to find, when I got home and placed my booty under the microscope, that this gathering contained some interesting rarities. First, *Amphora Normanii* Rab., found by the Hull naturalist, George Norman, on the walls of an orchid house in 1853, and since then unrecorded in Yorkshire. Dr. Van Heurck's collaborateur, M. Delogne, found it in a similar situation in the Botanic Gardens at Brussels. But that it is not confined to such semi-tropical conditions I have proof in another slide of Mr. Norman's, of a gathering from Cambuslang Bridge, near Glasgow. This slide* is dated 1857, four years after the original discovery. And here it was in Wharfedale!

Second, and very plentiful, *Cymbella microcephala* Grun., presumably a new record for the West Riding, as it does not appear in West's 'Alga Flora,' though I found it myself some years ago in drippings from cliffs at Flamborough, in the East Riding.

Thirdly, *Cymbella leptoceras* Grun., a strikingly beautiful form which I had never seen before, and which seems to be a new record for Yorkshire.

The bulk of the gathering consisted of the above forms along with the common *Achnanthes linearis* W. Sm. In addition to these there were present in small numbers the following:—*Achnanthes lanceolata* Breb., *Meridion circulare* Ag., *Navicula viridula* Kutz, *Nitzschia denticula* Grun., *Pinnularia borealis* Ehr., *Synedra acus* (Kutz) Grun., *Synedra pulchella* Kutz, *Synedra ulna* var. *longissima.*

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* In the Hull Museum.

YORKSHIRE NATURALISTS AT HALIFAX.

Halifax has long been known as an active scientific centre in the county, and on the occasion of the Forty-sixth Annual Meeting held there on December 14th, there was every evidence of its reputation being kept. Notwithstanding the most miserable of weather, members and delegates assembled from every quarter of the county, there being representatives from no fewer than forty affiliated societies at the general meeting held in the afternoon.

Those arriving early in the day took part in the excursions which had been arranged. The geologists, under the guidance of Mr. W. Simpson and Mr. W. Fielding, climbed Beacon Hill and visited Southowram, where some quarries were examined, and characteristic Carboniferous fossils secured. Other members visited the Natural History Museum, under the guidance of Mr. W. B. Crump, M.A., one of the honorary curators.

Early in the afternoon the various sectional meetings were held, when the officers for 1908 were recommended for election. The Forty-sixth Annual Report, which was presented by the secretary, shewed that in many of the sections and committees work of exceptional value had been accomplished. The Wild Birds and Eggs Protection Committee had done practical work by securing subscriptions for the payment of watchers at Spurn Point and other places in the county, with the result that many species of rare birds, which had been on the point of extermination, had increased in numbers. The Committee of Suggestions for Research also had made some excellent suggestions for future work, including the thorough investigation of Thorne Waste, one of the few remaining tracts of common left in the county, and even it is quickly disappearing.

The excursions for the year were fixed as follows:—May 16th, Topcliffe; Whit week-end, June 6th to 8th, Hornsea; July 16th (Thursday), Hampole; Bank-Holiday week-end, August 1st to 3rd, Osmotherley; week-end, September 5th to 7th, Clapham; and the annual Fungus Foray will be held at Mulgrave Woods, September 19th to 24th. The next Annual Meeting of the Union will be held at Doncaster, by the invitation of the Doncaster naturalists.

The officers for the ensuing year were elected as follows:—President, Dr. Wheelton Hind; Treasurer, Mr. H. Culpin; Hon. Secretary, Mr. T. Sheppard. The following are the presidents of the Sections and Committees:—Vertebrate Zoology, R. Fortune ; Conchology, W. H. Hutton ; Entomology, W. Denison Roebuck ; Botany, Dr. W. H. Smith ; Geology, Cosmo Johns ; Glacial Committee, Prof. P. F. Kendall ; Carboniferous Rocks, Fossil Flora and Fauna Committee, R. Kidston, F.R.S. ; Coast Erosion Committee, F. F. Walton ; Geological Photographs Committee, Prof. P. F. Kendall ; Micro-Zoology and Micro-Botany Committee, M. H. Stiles ; Marine Biology Committee, Dr. H. C. Sorby, F.R.S. ; Biological Committee, W. Ingham ; Coleoptera Committee, M. L. Thompson ; Wild Birds and Eggs Protection Committee, W. H. St. Quintin ; Mycological Committee, G. Massee ; Botanical Survey Committee, Dr. T. W. Woodhead ; Committee of Suggestions for Research, Prof. P. F. Kendall ; Hymenoptera, Diptera and Hemiptera Committee, G. T. Porritt.

The divisional secretaries and local treasurers were re-elected, with the addition of Mr. H. E. Wroot as local treasurer for Bradford.

The Treasurer reported that on the year's work, notwithstanding the heavy expenditure, there had been a saving, but there yet remained a debt from the previous year, due to the publication of 'North Yorkshire,' which required dealing with.

In the evening the President, Mr. C. Crossland, delivered his address; the Mayor of Halifax, Alderman W. Wallace, J.P., presiding. Every seat in the large hall was occupied, and in addition considerably over a hundred were standing. The audience alone was a great compliment to Mr. Crossland, whose excellent work amongst the fungi of the county is so well known. He appropriately selected for the title of his address 'The History of the Study of Fungi in Yorkshire,' an address of peculiar value to Halifax from the fact that the first book dealing solely with fungi was written by a Halifax man, Mr. James Bolton. We hope shortly to print Mr. Crossland's valuable address *in extenso* in these pages.

In addition to the Mayor's remarks, a warm and appreciative tribute was paid to Mr. Crossland by Alderman Booth, a brother 'Knight of the Cleaver.' It can safely be said that Alderman Booth's address was one of the most entertaining and refreshing that was given during the whole of the day's proceedings.

After the address a conversazione was held in the Bankfield Museum. In addition to the ordinary exhibits there were several of special interest. The large series of beautiful drawings of fungi, made by the president, was very favourably commented upon. There was a very good show of microscopes, and Mr. Riley Fortune and others lent some stereoscopes and slides. To enumerate all the exhibits is not possible, but reference might be made to the rare local birds lent by Mr. A. Crabtree ; exotic shells lent by Mr. W. Cash, fossil fish lent by Dr. Wellburn, dried plants lent by Mr. C. Waterfall, and an excellent series of photographs of architectural details of local interest by Mr. Kendall. Refreshments were provided, and in every way the evening proved a success. T. S.

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FIELD NOTES.

BIRDS.

White Sparrow at Harrogate.—A White Sparrow has for some time frequented the neighbourhood of my house. His white plumage makes him very conspicuous among his more sober coloured relations.—R. FORTUNE.

Turtle Dove nesting at Wetherby.—It may be interesting to record that the Turtle Dove has this year nested at Wetherby, and has safely reared her young. This species is gradually extending its range over the county.—R. FORTUNE.

Hobby in Nidderdale.—I regret to have to record the slaughter of a male Hobby near Nidd. in June 1907. This is specially to be regretted, as the time of year and the locality in which it was shot, leads one to suppose that it might have had a mate and a nest near at hand.—R. FORTUNE.

Great Grey Shrike in Nidderdale —On November 30th, whilst cycling near Nidd., I observed a bird perched on the top of a large hawthorn bush. It was a very conspicuous object, and closer inspection revealed, as I suspected, a fine Great Grey Shrike. A feature which makes the occurrence more noticeable was that the bird was attempting some kind of a song, which did not resemble any I know. I have frequently seen these birds, but have never previously heard one attempt to sing.—R. FORTUNE.

Longtailed Tits in Craven.—A pair of these birds bred successfully in our district this season, having reared seven young. I came across them one evening in the woods, all perched on the branch of a fir tree in a row, and it was very interesting to watch the parents continually flitting to and fro carrying food to them. A few days later I heard of a brood having been seen a few miles away, which I think must have been another family. A week later I came across the brood I had previously seen a short distance from the tree where I first saw it. The parents of the young were very bold, and my presence did not disturb them from their duty towards the nestlings.

The fact that the breeding of these Tits has not been recorded in this district for over thirteen years made their reappearance very interesting.—Walter Wilson, Skipton-in-Craven.

Pied Rooks in Nidderdale.—To day I saw a very interesting specimen of the common Rook near Hampsthwaite Station. The back, breast, and wings were plentifully bespattered with white, giving the bird a very striking appearance, especially when on the wing. Contrary to one's usual experience with conspicuous varieties, the bird was not at all wild or shy; indeed, it was comparatively tame. Inquiries resulted in the information that it had been in the district four or five years, and came regularly into the Station-master's yard for food. It would almost take food out of the hands of the Station-master's wife. A plate-layer has twice endeavoured to end its life with a gun, but each attempt has, I am glad to say, resulted in failure. Crossing over the Stray at Harrogate about an hour afterwards, I saw another Pied Rook with a lot of white feathers on the back and wings.—R. Fortune, Harrogate, November 18th, 1907.

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LEPIDOPTERA.

***Butalis fusco-cuprea* at Luddenden Foot.**—I am pleased to record that on July 14th, 1907, I captured a male *Butalis fusco-cuprea* here. I have submitted the insect to Mr. G. T. Porritt, and he confirms my determination. I believe this is the first record for the West Riding. This moth has only been recorded previously from two places in Yorkshire, viz., Everingham (near York), and Scarborough.—A. Gibson-Robertshaw, Luddenden Foot, near Halifax.

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NEUROPTERA.

Metamorphosis of the Caddis.—A caddis has just dropped its 'house' to the bottom of the aquarium, 27th May, 10 a.m., and is now on the side trying to get rid of its skin. This took about fifteen minutes. Its long antennae were noticeable tucked under its body, these being gradually released from between the body and the glass until they were fully stretched in their natural position. Next the wings were freed, though not unfolded; they were of a light grey colour. When the insect had got rid of its skin it remained almost motionless for thirty minutes whilst its wings were drying. Then the long slender wings were spread and a short flight taken. Short flights and rests alternated for a couple of hours, then the caddis fly finally left the vicinity of the aquarium.—(Mrs.) M. E. WILLIAMSON, Headingley.

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MOLLUSCA.

***Petricola pholadiformis* in Lincolnshire.**—I was glad to see the notes by Mr. C. S. Carter under the above heading in your November issue, having myself found this species stranded *in thousands* at Skegness early in the present year. Although most were dead, many specimens were alive. The Skegness examples are much larger than the specimen figured in Woodward's Mollusca, where New York is given as the home of this species. My largest measures 2⅜ ins. by 1⅛ ins. I found *Petricola* again at Skegness alive on the shore only yesterday (Nov. 8th). I have also taken it this year at Cleethorpes, so perhaps we may include it in our Yorkshire fauna ere long. I should like to know why it appears in the Conchological Society's list as one of those species 'whose claims to be regarded as British are very doubtful.'—W. GYNGELL, Scarborough.

Progress of Egg Development in *Limnea stagnalis*.—The following notes may be worthy of record:—

JULY 31st, 1907, 6 p.m.—Egg sac deposited on side of aquarium. Milky white in colour, 1¼ inches in length.

AUG. 1st, 6 p.m.—Sac now transparent. Counted 86 eggs in sac, each one slightly overlapping its neighbours; they seem to be arranged in about 25 rows of three each, the sac being a little wider in the middle than at the ends. Each egg is shaped like a hen's, the embryo (a little brown dot) being at the lower end.

AUG. 9th.—Embryo has grown, but no change in colour.

AUG. 17th.—The form of the snails can now be plainly seen, the shell having a light brown colour, the snail being darker in colour, and denser.

Aug. 22nd.—The sac has a somewhat shrunken appearance, but yet unbroken—the snails have increased in size.

Aug. 24th—The snails seem to be ready for emerging from sac.

Aug. 25th, 7 a.m.—Thanks to a voracious roach, snails and sac have entirely disappeared!—(Mrs.) M. E. Williamson, Headingley.

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FLOWERING PLANTS.

***Cochlearia danica* at Arncliffe :** A Correction.—The record of *Cochlearia danica* at Arncliffe ('Naturalist,' October, p. 349), was made on a specimen I collected. Further examination, however, shows this to be *C. alpina*, and not *C. danica.*—C. Waterfall, Hull, November 11th, 1907.

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Mr. A. S. Kennard has a paper 'On *Vitrea* (*Hyalinia*) *hibernica*, n.sp., in the November 'Irish Naturalist.'

Dr. E. J. Russell has a useful paper on 'The Relation between the Geographical Position and the Productive Capacity of Land,' in the 'Journal of the Manchester Geographical Society,' Part 1 of Vol. 23. With the number quoted this journal appears in a new and attractive cover.

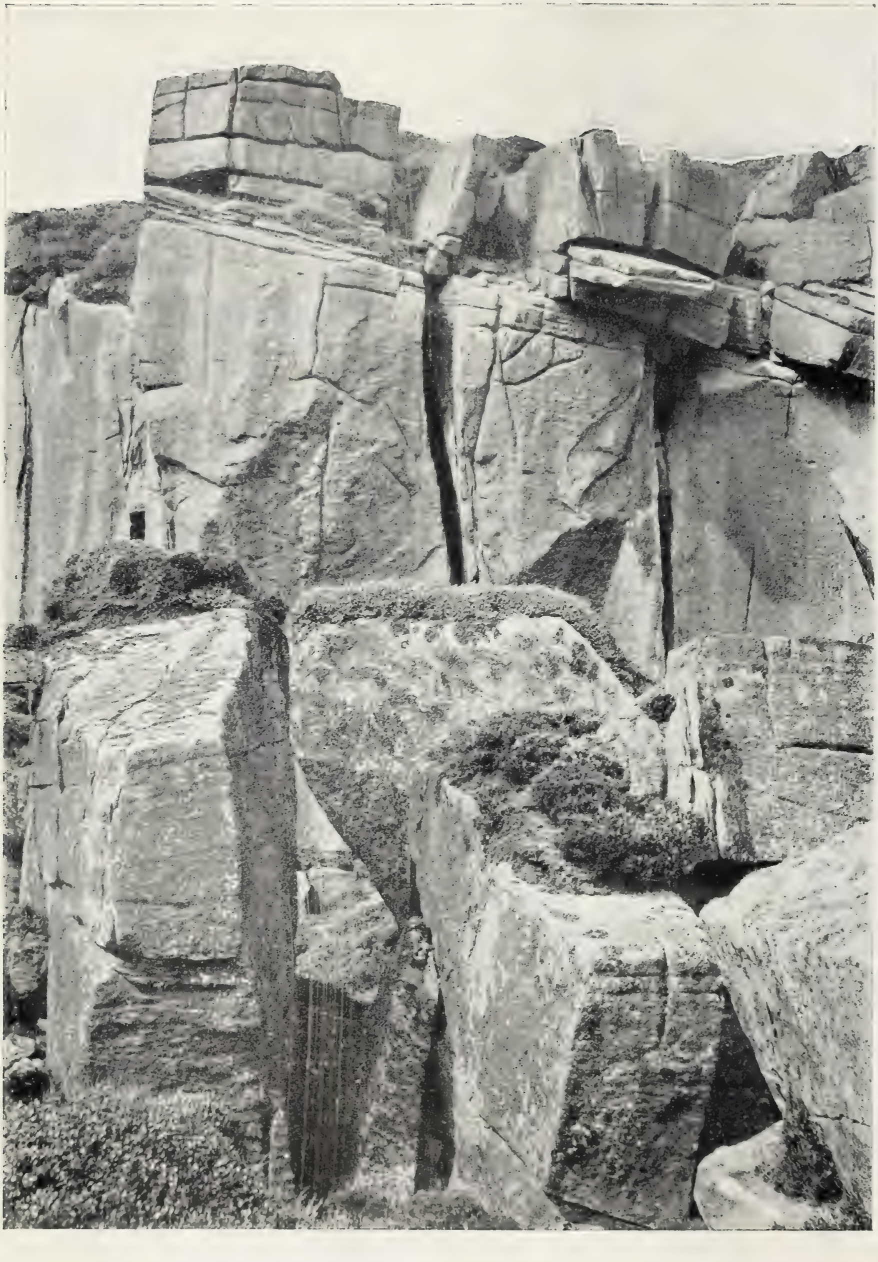
In the 'Transactions of the Manchester Geological and Mining Society' (Vol. 30, parts 6-8) Mr. F. J. Thompson has a paper on 'The Rock-salt Deposits at Preesall, Fleetwood, and the Mining Operations therein.' As usual, the 'discussion' following this paper, which is printed, is worth reading.

A useful record of a useful year's work at the Manchester Museum is contained in the report for 1906-7, just to hand. Owing to his removal from Manchester, Mr. J. Cosmo Melvill has resigned the position of Chairman of the Committee, and his place has been taken by Mr. H. Plummer. As Publication No. 61, the Museum has also issued a set of 'Museum Labels'—The Principal Divisions of the Cœlenterata.

The Annual report of the Huddersfield Naturalist and Photographic Society for 1906-7, is to hand, and contains a useful summary of the work accomplished in the different sections. The Society probably holds a unique position in the county, inasmuch as its treasurer can report, for the third year in succession, that 'no subscriptions remain outstanding.' And we have good reasons for expressing our great surprise at the Society having over £23 in hand.

Amongst the papers read at the recent annual meeting of the Yorkshire Geological Society was one on 'The Influences of the Pennine Faults on the Formation of Caves, Pot-holes, and Underground Drainage of the Carboniferous Limestone of the Craven District.' The whole of the master-joints and fissures and pot-holes in the limestone were attributed to 'faults,' formed somehow in a similar way to the crevasses on a glacier, a photograph of which was thrown upon the screen. A 'right royal slaughter' followed, in which a professor of geology, a member of the Geological Survey, a F.R.S., several F.G.S's., a D.Sc., and geologists who have lived in the Craven district all their lives, took part. Yet after all, the author was convinced that 'his theory was right.'

BRITISH MUSEUM NATURAL HISTORY



Hell Grag, Tarnbrook Fell. Habitat of *Andræa Rothii*.

REVIEWS AND BOOK NOTICES.

The Flora of West Lancashire, by **J. A. Wheldon, F.L.S.,** and **Albert Wilson, F.L.S., F.R. Met. Soc.** Published by the authors, 1907. 511 pp., 15 plates and coloured map, 12/6.

The publication of the present volume is welcomed in that it takes away the reproach from the botanical science of half Lancashire, that despite the interesting character of the varied plant associations and the long and honoured roll of field workers, it gives for the first time an ordered account and adequate list of the plants and their stations. Westmorland and South Lancashire alone of the northern areas remain without a sufficient floristic account.

The area monographed is Watson's Vice-County No. 60, and is bounded on the north by an irregular line from Arnside on the coast to the County Stone on the ridge of Greygarth, on the south by the Ribble, on the east by the high watershed of Bowland and the Hodder, and on the west by a long and indented coastline. Though in Lancashire there is little of the county of popular experience and imagination in the remote and wooded dales cutting deep and high into the wild grouse moors of Abbeystead and Littledale, the pleasant foot-hills and richly cultivated lowlands of Lonsdale and Wyresdale, where the smoke cloud of the industrial coal-field does not obscure the sun and cast continual gloom. Beyond the pleasant and varied prospect of the area as seen from some such height as Wards Stone, to the botanist there is further interest ; for within the four quarters of the area many rare species of interesting character find suitable habitats. On the ridge of Greygarth there is an approach to the sub-arctic heath, in the presence of *Salix herbacea.* The broad fell sides are, for square miles, covered by deep deposits of peat, above which dominate the varied associations of the moor, the Sphagnum, Eriophorum, Eriophorum with Calluna, and the Calluna moors. Here Cloudberry finds its life conditions well satisfied. Drier fell-edges are dominated by Calluna and grass heaths, in some places of exceptional interest. The numerous gills are wooded with oak and ash and festooned by ferns. About Silverdale and Burton, as also about the gills of Leck Fell, are bared pavements or swallow holes, the homes of the richly varied species of the associations of the limestone. The Lowlands have interest in the numerous relics of the once extensive peat mosses, which frequently show plainly the succession from the swamp to the heath moor. The littoral associations are of interest, alike the scanty outcrops of hard rock and the extensive salt marshes about the shores of Morecambe Bay and the estuaries of the Lune and Wyre.

In such a district the authors have laboured for years, as leisure from business allowed, and the present volume is the result. It is evident from a perusal of the floristic part of the book how many gaps in our knowledge of the existence and distribution of plant species they have filled. But the book is more than a compilation of the names and stations of the Spermaphyta, Pteridophyta, Bryophyta, and Lichens, as will be understood from the discussion of the topography and meteorology, the climate and edaphic factors as they effect the distribution of plants, In this illuminating preface of 127 pages the authors have conceived their duty intelligently as one to make plain to students and field workers what kinds of plant grouping obtain, and within self-imposed limits of space and procedure have produced a memoir which has a place not sub-ordinate to the list. An interesting meteorological section brings out the observation that the vegetation is generally from a week to a fortnight earlier than in Yorkshire, this advance, however, being checked and the lagging begun in July. In a brief discussion of the plant distribution as affected by the edaphic characters of the station, the conditions of life of the various associations are passed under review according to the systems of Warming, Schimper, and British plant geographers. The woodlands of the area, however, are meagrely dealt with. It is noted that Pteris may adapt itself to limestone soil as Calluna would appear to do in Westmorland, Somerset, and Yorkshire. Juniper may be seen growing on the shales and grits in Upper Hindburndale, amidst soil conditions widely different from those of the limestone pavements and chalk-downs where it is more frequently found. Yet here it should be considered that in North Germany it is considered a typical plant of the heath moors; and in our own Lake District of the Silurian grass heath or Sphagnum bog. Most interesting studies are suggested in the part dealing with the distribution as affected by the altitude. The descent to sea level of limestone plants, limited at a much higher level in the neighbouring Yorkshire, and the general uncertainty of the grouping of the species into altitudinal groups would seem to indicate that single factors alone should not be considered as conditioning the existence in a particular station of a plant, but rather that complex and varying play of a group of factors of which the plant associations, rather than physical and chemical statistics, are the most accurate measure. Two seed plants alone are given as truly montane, one of which, *Carex rigida*, may be simply an ecad, and the other, Cloudberry, in view of the fairly common occurrence at sea-level on the heath moors of Memel-delta on the Baltic, would seem to be distributed according to the association. It is conceivable that if the lowland peat mosses of the plain had been allowed to work out their slow succession, they would have become the habitats of the Cloudberry.

It is to some extent a matter for regret that the intention declared or suggested some time ago of undertaking a more detailed Botanical and Geographical survey, on the lines of Smith and his co-workers, on the other side of the Pennines, has had to be dropped. The alternative to the usual Flora was suggested in Crump's 'Flora of Halifax,' its application to a wide area by Dr. Moss in the 'Survey of Somerset,' and in an intensive study by Graebner and others of the Continental schools. As it is, the work serves as a storehouse of information and suggestion to workers on more strictly ecological lines, and it is be hoped that soon the area will be added to that immediately to the north as one surveyed.

In the chapter dealing with Mosses, Hepatics, and Lichens the authors are evidently in their element, and the account on the whole is excellent. They are described and arranged in four groups, Rupestral (with 3 sub-divisions), Terrestrial (with 6 sub-divisions), Arboreo-terrestrial and Arboreo-rupestral and Arboreal. As they state, these are 'admittedly crude classes,' but we agree with their further remark that they 'will no doubt give a good general idea of the nature of our cryptogamic flora.'

Bound up with the letterpress there are fifteen reproductions of photographs of limestone and moorland associations. It may be suggested, at the risk of being considered ungracious, that the representation of other associations, as the salt marsh, the lowland peat bog, swamps of tarn margins, etc., would have made the set, at the expense of duplicates, more complete as a photographic record. The map is of a simple geographical type, and makes no attempt to suggest the variety of soils or of plant zonation.

In the Flora proper, the plan adopted is that of Baker's 'North Yorkshire,' and includes 958 species of the higher plants, 330 species of Mosses, 94 Hepatics, and 302 Lichens. This excellent flora, which worthily takes its place alongside its forerunners, Baker's 'North Yorkshire' and Lee's 'West Yorkshire,' should find a place on the shelves of all northern botanists. We are enabled to reproduce one of the illustrations (Plate VI.).

W. M. R.

A Bird Collector's Medley, by **E. C. Arnold, M.A.** London: West Newman & Co., 1907. 144 pp., plates, 10/- There is a delightful freshness and originality with this book which at once demands the reader's attention. It is entirely from the author's 'own bat,' is a straightforward narrative of many pleasant shooting expeditions, with descriptions of the birds and their habits, from direct observation, and does not contain a single reference or footnote from beginning to end. In his Introduction Mr. Arnold takes up the cudgels on behalf of the amateur bird collector, who shoots and stuffs his own specimens. He will have nothing to do with the type of man who buys from the dealer, and confines his personal efforts to arranging and labelling them in a cabinet. He deals largely with shore birds, and gives many interesting narratives about them. His chapter 'From the point of view of a Dunlin' is particularly good. His collecting areas are varied—Cornwall, The Broads, The Downs, Wicken Fen, the New Forest, etc. In addition to the reproductions of photographs in the text, there are several plates (collotype and coloured) from the author's own sketches, most of which are very successful, The whole book reflects great credit upon the owner of the collection of birds in the Eastbourne Institute.

English Church Furniture, by **J. C. Cox** and **A. Harvey.** Messrs. Methuen & Co., London, 1907. 398 pp., price 7/6. This is one of the well known 'Antiquary's Books,' and differs from its predecessors in being perhaps of more general interest, in containing more pages, and more illustrations. With Dr. Cox as one of the authors, the question of the reliability of the volume need not be raised. The student of past history is almost sure to find some treasure in the village church, but it so often happens that the local 'guides' and guidebooks are most untrustworthy. What is more, really reliable informotion often means a long search through scattered papers and proceedings of antiquarian societies. In 'English Church Furniture,' however, the authors have gathered together references to almost all the objects of interest which have been described in scores of out-of-the-way places ; and in addition they have paid personal visits to churches up and down the country to a number that is extraordinary. In this way, in addition to giving a good general account of the various types of church furniture, they have added lists of the churches in which particular objects can be found. For purposes of comparison this is exceedingly valuable. For example, on a recent meeting of a local antiquarian society to the church at Old Bridlington, the reader of a paper referred to a stone offertory box which he had recently 'discovered,' and which he thought was unique. Had he referred to 'English Church Furniture' he would have seen a figure and description of this well-konwn offertory box, as well as particulars of other similar objects. We hope that one result of this excellent volume will be that the clergy will understand and appreciate the value of the relics preserved in the edifices under their charge, and will not be so ready to 'renew' or 'restore' them as they have been in the past. The Index is unusually complete and useful.

Roman Sculpture from Agustus to Constantine, by **Mrs. Arthur Strong, LL.D.** London : Duckworth & Co., 1907. 408 pp., price 10/- net. Mrs. Strong, née Sellers, has produced a beautiful book under the above title, and by her careful descriptions and the wealth of illustrations which accompany them has placed the student of the important period dealt with in possession of a sound and substantial guide. The book is based upon a series of lectures given during the past seven years, and as might be expected, the authoress has been largely influenced by Wickhoff, whose æsthetic ideas are put forward in the book of Romam Art which she translated. To these, much valuable information has been added, resulting in a reliable book on Roman Art, which has long been required. Mrs. Strong has also earned the gratitude of all interested in Roman history by the exceptionally complete series of footnotes and references to papers and books which have a bearing upon the subjects dealt with. In view of the lack of suitable bibliographical equipment in this country, such references are exceptionally valuable. It is pointed out that the popular prejudice against Roman Art is largely rooted in ignorance of its most obvious manifestations. There can be little doubt that 'Roman Sculpture' will do much to place Roman Art in the position it deserves. For the illustrations alone we are grateful, as, to our disgrace be it said, reference has in the past largely had to be made to foreign publications to enable the student to get anything like an accurate idea of the beauty aud detail of the Roman carvings of the first, second, and third centuries A.D. Perhaps the most interesting portion of the work is that dealing with 'Roman Portraiture,' and this is illustrated by a profusion of beautiful reproductions from photographs of busts, medallions, coins, etc., which is alike creditable to authoress and publisher. There is a good index.

NORTHERN NEWS.

Mr. F. Boyes, of Beverley, had two crops of pears from one tree in 1907, and in November it was in bloom for the third time.

Sir John Evans celebrated his eighty-fourth birthday on Nov. 17th. The Rev. W. H. Egerton was ninety-six on Nov. 13th, and has been a Fellow of the Geological Society for seventy-five years!

The Annual Report of the Warrington Museum, etc., has been received, and contains particulars of the additions made during the twelve months. Over a thousand specimens have been added. Amongst them are several pieces of Samian Ware, arranged by Mr. T. May; a collection of foreign insects found in Warrington, and twelve cases of types of British beetles, by Mr. G. A. Dunlop.

Some good should result from the Royal Commission on Coast Erosion. We have before us Volume I., Part 2 of the Minutes of Evidence accompanying the First Report of the Royal Commission appointed to enquire into and report on certain questions affecting Coast Erosion and the Reclamation of Tidal Lands in the United Kingdom. It contains over a thousand closely printed foolscap pages.

Mr. F. Boyes recently writes to the 'Field' recording the capture of a Great Grey Shrike near Beverley. This was towards the end of November. He also states that a fine old pink-footed gander, which he had lately shot, had quite rich pink coloured feet and legs when first secured, but 'within an hour after death this colour had faded and left the legs and feet a pale flesh colour, almost white.' No wonder descriptions vary.

At the recent annual meeting of the Lincolnshire Naturalists' Union, the President, the Rev. A. Hunt, gave an address on 'The Pigmy Flint Age in Lincolnshire.' He stated he was jealous of a certain Yorkshire museum which had secured so many fine Lincolnshire antiquities. A reason was given that it was 'merely a question of money.' We don't quite know what is meant, as if ever there was a museum living in a state of chronic hard-up-ness, it is that Yorkshire institution.

There have recently been two sales of collections made by Yorkshire geologists. The first was formed by the late J. W. Davies, F.G.S., of Halifax, and was sold at Leeds on Nov. 14th. It included a fine series of fossil fishes, amongst which Davis worked so well. The other consisted of the fine series of fossil and recent mammalian remains got together by the late James Backhouse, of York, and was sold at Stevens' rooms, London, on December 2nd. It seems a pity that such collections as these should find their way to the sale room.

At a recent meeting of the Lancashire and Cheshire Entomological Society, Mr. B. H. Crabtree shewed a fine series of the local melanic form of *Boarmia repandata* from Penmaenmawr, the females especially showing the white blotches characteristic of this local race; *B. gemmaria* var. *perfumaria* from Manchester; varieties of *Angerona prunaria* from Monkswood; *Aplecta nebulosa* var. *robsoni* from Delamere Forest; *Agrotis ashworthii* from Penmaenmawr; and *Chariclea umbra* from Sidmouth. Mr. Robert Tait, Jr., showed a number of local species, among them being a long series of *Agrotis ripae* from S. Wales coast; *A. ashworihii*, N. Wales, a series captured at rest; *Hemerophila abruptaria*, the chocolate form, from the London district; *Lobophora viretata*, *Anticlea derivata*, and *Larentia salicata* from lake side, Westmorland; *Diantheciæ nana* and *Eupithecia jasioneata* from Abersoch. Mr. H. R. Sweeting exhibited a series of *Noctua castanea* and var. *neglecta* from Delamere; *N. glareosa* and *N. brunnea*, also from Delamere; and *Moma orion* from the New Forest. By Mr. W. Mansbridge a bred series of *Odontopera bidentata* from Wakefield, including var. *nigra* and diaphanous specimens.

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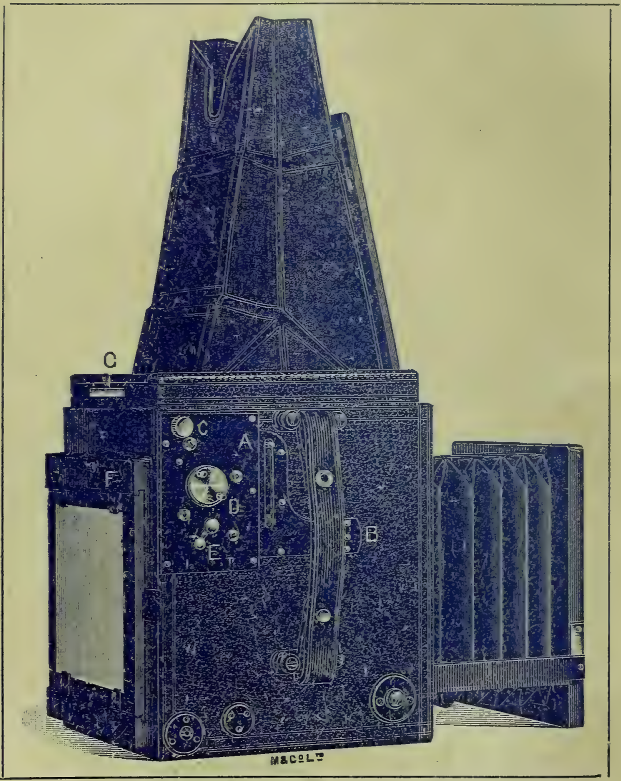

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T. SHEPPARD, F.G.S., F.S.A.Scot.,
The Museum, Hull;
AND
T. W. WOODHEAD, Ph.D, .F.L.S.,
Technical College, Huddersfield.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
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NOTES AND COMMENTS.

DR. H. C. SORBY, F.R.S.

We were glad to see the following in a recent issue of 'Floreamus,' a Chronicle of the University of Sheffield:—'We must join all the friends of our most distinguished fellow-citizen in congratulating him upon the signal honour paid him by the Geological Society of London on the occasion of its centenary meeting. Dr. Sorby was unfortunately too infirm to be present at the meeting, but the following letter, addressed to him in such terms by his brother geologists of all lands, afforded him, as is natural, what may be called the crowning pleasure of his life:—

Geological Society,
Burlington House, W.,
27th September, 1907.

To the Father of Microscopical Petrography,

'We, the undersigned, assembled to celebrate the Centenary of the Geological Society of London, desire to unite in expressing our profound conviction of the important service rendered to the branch of Geological Science which they cultivate by the pioneer labours of Dr. Henry Clifton Sorby. They deplore the circumstances which prevent him from joining them on this interesting occasion, but beg to be allowed to assure him of their great admiration of his life's work, of their filial regard, and deep affection. They rejoice to know that he still finds consolation and happiness in his labours of love in connection with the promotion of Scientific Research and Education.'

F. Zirkel.
Arch. Geikie.
W. J. Sollas.
W. C. Brögger.
Whitman Cross.
Frank J. Adams.
F. W. Rudler.
H. Arnold Bemrose.
A. Wichmann.
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J. J. H. Teall.
Chas. Barrois.
George F. Becker.
Jos. P. Iddings.
W. W. Watts.
C. Vélain.

NEW METHODS OF GEOLOGICAL STUDY.

The preceding reminds us that at a recent meeting of the Geological Society of London, a paper by Dr. Sorby was read, which will do much to revolutionise the methods of geological study. The paper was entitled 'On the Application of Quantitative methods to the study of the Structure and History of Rocks.' In this, Dr. Sorby pointed out that the knowledge of the final velocities of material subsiding in water is of fundamental importance ; but the relation between size of particles and velocity is complex, and perhaps may be partly explained by a thin, adherent film of water. The angle of rest in the case of sand-grains of varying size and quality enables us to ascertain approximately the velocity of current necessary to keep such sand drifting, and that needed to move it when at rest. The comparison of this angle with that observed in sedimentary rocks made of similar materials may be used to determine the amount of vertical contraction of rocks since deposition, the average in cases studied in Tertiary and Secondary rocks being from 100 to 57.

CURRENTS AND SAND.

In studying the drifting of sand along the bottom by currents (on which the author experimented in a small stream many years ago), the results are found to vary, according to whether the water is depositing sand as well as drifting it, and according to whether ripples are or are not being formed on the bottom. The velocity of a current can be determined approximately in feet per second for different kinds of sand. The connection between the structure of ' ripple-drift ' and time was discussed ; and an equation given, from which the rate of deposit in inches per minute can be deduced. The connection between the structure of a deposit and depth of water is found to be difficult to study quantitatively. From the occurrence of ' drift-bedding ' the depth of water may probably be determined to within a few feet, and on this being applied to particular rocks some interesting results come out, including the separation of sandstones into several different groups.

CLAY DEPOSITS.

The deposition of fine deposits, like clay, is a most complex subject, varying according to the amount of mud present in the water, and according to whether the grains subside separately or cohere together. When no pressure is applied, even when no further contraction takes place on standing for a year, the amount of water included in the deposited clay may be 80 per cent., and when dry, the minute empty spaces may still amount to 32 per cent. This leads to the conclusion that many of the older rocks must now be only 20 per cent. of their original thickness. In many cases there is produced by a gentle current a minute laminar structure from which probably the rate of deposition may be learned approximately, a common rate in the older rocks being from 9 to 18 inches per hour. But complex and difficult experiments are very desirable on this question. The rocks classed as clays differ very much in structure, and must have been formed under different conditions.

ANCIENT VOLCANIC ERUPTIONS.

Applying these conclusions to various rocks, the Author shows that in the green slates of Langdale there is good evidence that the volcanic eruptions sometimes occurred within a few weeks of one another, and at other times at more distant intervals. Now and then there were bottom-currents, probably due to volcanic disturbances, gradually rising to a rate of about 1 foot per second and gradually subsiding, the entire period being a few minutes, and deposition taking place in different cases at from $\frac{1}{10}$ to 2 inches per minute. There is also good evidence that, when deposited, part of the rock was analogous to fine, loose sand, and part to semi-liquid mud. In the Coal-Measure sandstones deposition at the rate of 1 inch per minute was common, with intervals of little or no deposit.

MINUTE CAVITIES IN ROCKS.

The volume of invisible cavities in rocks varies from 49 per cent. in some recent rocks, to nearly 0 in the ancient slates. The packing of grains was discussed mathematically and experimentally, the latter with round and flattened shot ; and experiments with sands of various qualities, rapidly deposited and also when well shaken, show a good agreement with calculation. The methods of determining the volume of minute cavities in rocks are given, followed by a number of examples from recent and older deposits. It is found that in some limestones the cavities have been reduced by pressure to close on the mathematical minimum, whereas in others, even of Silurian age, the cavities were filled with carbonate of lime, introduced from without, not long after deposition. Some oolites have had their cavities filled in a similar manner ; in others most of the material of the original grain has been removed, and the present solidity is due to the filling-up of the original cavities mainly by internal segregation. Among fine-grained rocks the Chalk probably was originally a sort of semi-liquid with fully 70 per cent. of its volume water, and in its present state is about 45 per cent. of its original thickness ; the thickness of some clays must have diminished still more ; while the amount of minute cavities in rocks with slaty cleavage is so small, that sometimes they are nearly solid.

EXTENT OF PRESSURE UPON ROCKS.

By the measurement of green spots in slates it can be deduced that the rock before cleavage was somewhat more consolidated than rocks of the Coal-Measures now are, and was then greatly compressed and the minute cavities almost completely squeezed up. The development of 'slip-surfaces' in cleaved rocks is very great, and furnishes an additional proof that the cleavage is of mechanical origin. 'Pressure-solution' was also dealt with.

In conclusion, the author discussed the volume of minute cavities in clay-rocks and their analogues of various ages, and showed that there is a distinct relation between it and the probable pressure to which the rocks have been exposed. Tables were given of the pressures so calculated for rocks of various geological ages, the volume of empty spaces decreasing in older rocks from the 32 per cent. existing in recent clays. In the Moffat rocks, with very little or no slaty cleavage, the pressure is calculated at about 7 tons to the square inch, while the Welsh slates, with very perfect cleavage, indicate a pressure of about 120 tons to the square inch.

LORD KELVIN.

By the death of Lord Kelvin, which took place at his residence, Netherhall Largs, on the Ayrshire Coast, in December, Britain has lost her greatest natural philosopher. He was in his eighty-fourth year, and died from the effects of catching a severe chill. He was born at Belfast on June 26th, 1824. At 22 years of age he was appointed to the Chair of Natural Philosophy at the University of Glasgow, where he discharged his professional duties for fifty-three years. He was present at the meeting of the British Association at Leicester a few months ago, and the ovation he received when he appeared on the platform at the opening ceremony was evidence of the esteem in which he was held by the members there assembled. His remains were interred in Westminster Abbey, and probably on no previous occasion have so many prominent scientific men met within the Abbey walls as when Lord Kelvin's remains were taken to their last resting place.

THE NETHERWORLD OF MENDIP.*

This is a work of a type of which we have seen a good deal in recent years; a work which records the hardships and privations, the 'discoveries,' 'explorations,' and 'investigations' made during half-day or week-end rambles in more or less well-known caves and pot-holes. The extraordinary dangers of cave exploring are well and frequently described in the book. We learn what 'the first explorers must undergo, when to the ordinary difficulties of such an exploration is added the great uncertainty felt at every step taken, and when every boulder upon which our weight is to rest must first be carefully examined.' And 'the exertion it [cave exploring] entails is exceedingly severe. The innumerable obstacles and difficult problems to be faced make incessant demands on our inventiveness, adaptability, and presence of mind. The exposure, the hardships, the dangers that must be encountered, form an admirable discipline,' and so on. The marvel is that so many of these 'explorers' get home unharmed. But they always do!

DANGERS OF CAVE EXPLORING.

In 'Strenouus [*sic*] Days in the Eastwater Swallet' the holes and pits are all 'awkward,' and 'deluged with water,' and the journey is 'painful,' the 'gigantic blocks' are 'seemingly on the point of collapsing' (whatever that may mean). 'The S-bend has to be taken with the body lying on its right side. Once in it the explorer cannot turn round . . . . My [*i.e.*, the explorer] candle went out half-way through, and to *unjam* my arm and get it down for the waterproof matches was a difficult and protracted operation.' There were also other 'severe tasks,' etc., etc.

SCIENTIFIC RESULTS.

We observe that one of the authors is responsible for the 'scientific results,' and he has been working at the geology of the Mendips, and especially the caves, for the past thirty years. We have failed to find any serious contribution to geological science in this part of the book, notwithstanding the fact that the work detailed is modestly described as supplementary to Prof. Boyd Dawkins' *Cave Hunting*, 'and, largely, outside the scope of his aims.' As a sample of the geological research, we find that the great chasms of Ebbor and Cheddar have 'rent the rocks asunder,' and 'the Carboniferous Limestone, evenly stratified everywhere, has been split by vertical joints into a series of gigantic cubes.'* The author is 'forced to the conclusion that the Cheddar Gorge was, during the whole of the Secondary period, a roofed-in cavern.' We don't quite gather why, any more than we see any evidence for the statements that certain unexplored portions of caves 'without doubt contain pre-historic remains,' etc. To make the scientific portion of the book a little plainer, there are, here and there, references to the 'annexed section,' but in each case there is no 'annexed section'! The book is fairly well 'got-up,' and has numerous illustrations (generally without anything to denote the scale), and whilst it may answer the purpose of those who undertake 'Cave exploring as a sport,' to the sober-minded geologist who is content with working above-ground, there is, we regret to say, but little of interest or value.

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* By E. A. Baker and H. E. Balch. Clifton; J. Baker & Son, 1907. 172 pp

◆

The **Science Year-book,** Diary, Directory, and Scientific Summary, 1908. King, Sell, & Olding, Ltd., 5/-

The volume for 1908 has all the good qualities of the volume for 1907, together with a few new features. There are some excellent summaries of 'Science in 1907,' in which are 'Astronomy,' 'Bacteriology,' 'Botany,' 'Physics,' 'and Zoology and Natural History.' 'Geology,' strangely enough is omitted. In the 'List of Societies' also we find Leeds, Birmingham, etc. societies, but the Yorkshire Naturalists' Union, with its four thousand members and associates, is apparently unknown. But these are small points, and the 'Science Year Book' is a wonderful production for five shillings.

Hazell's Annual, 1908. A Cyclopœdic Record of Men and Affairs for use in 1908, edited by **W. Palmer.** London: Hazell, Watson, and Viney, 1908. 602 pp., 3/6 net.

The fact that this well-known Annual has reached its twenty-third year of issue speaks well for it popularity. There are few subjects upon which one cannot find some information in Hazell. The Index itself is a work of art, and an idea of the variety of subjects upon which information may be found can be obtained from the following, selected haphazard :—Irrigation in Egypt, Picture Sales in 1907, Imports of Rabbits, Scientific Societies, Shell-fish, Statistics, Walking Championships, and Women's Suffrage ; and all for three-and-six.

Official Year-book of the **Scientific and Learned Societies of Great Britain and Ireland, 1907.** 341 pp., price 7/6.

In this, the twenty-fourth annual issue, all interested in science will find a valuable record of a year's work. The various 'scientific and learned' societies throughout the kingdom are here enumerated, their work during the year is carefully set out, and lists of papers read, etc., are given. In this way a worker in a particular department can easily see what is being done in the same direction in other parts of the country. To assist in this, the various societies are classified under the heads of 'Geology,' 'Archæology,' 'Medicine,' etc. The publishers of this 'Year Book' are doing excellent work.

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* The 'theory' is remarkably like the one propounded at a recent meeting of Yorkshire Geologists, referred to on page 28. It seems odd that a similarly brilliant idea should have originated in two minds at about the same time.

MARINE BEDS IN THE COAL MEASURES NEAR DONCASTER.

H. CULPIN.
Doncaster.

A SINKING for coal at Brodsworth, about four miles north-west of Doncaster, has given an excellent opportunity for the search for the marine beds referred to in Mr. Walcot Gibson's paper in the 'Naturalist' for April, 1906, pp. 112-3. Four such beds have been found, of which the top one, some 100 feet below the Ackworth rock, is probably the same as that mentioned by Mr. Gibson in his allusion to 'Green's note on the presence of *Aviculopecten* (*Pterinopecten*) and *Goniatites* below the Ackworth rock.' As exposed at Brodsworth, this bed yielded goniatites of which one was a well-preserved *Glyphioceras* sp., showing the suture lines, *Lingula mytiloides*, *Pterinopecten papyraceus*, *Posidoniella lævis* and *Nuculana acuta*. In it were also fish remains and a few plants.

The most important bed of the series occurred at 705 feet above the Barnsley coal, and 219 feet above the Melton Field coal. It consisted at the top of blue shales with fucoid markings, and with a soapy feel to the touch, Similar shales then followed with large numbers of *Lingula*, below which came harder shales of a greyish blue colour full of pectens, goniatites, etc. At the base was a hard limestone band. The whole of this bed is so markedly different, both to the eye and the touch, as also in its contents, from the usual measures, that it should form a good datum line in future borings and sinkings. The fossils found in it included *Chonetes laguessiana* mut. θ., *Orbiculoidea nitida*, *Lingula mytiloides*, *Syncyclonema carboniferum*, *Pterinopecten papyraceus*, *Ctenodonta lævirostris*, *Posidoniella sulcata*, *Myalina compressa*, *Nucula æqualis*, *Nuculana acuta*, *Euphemus* sp, *Pleuronautilus costatus*, *Glyphioceras micronotum*, *Glyphioceras reticulatum* (?), *Dimorphoceras Gilbertsoni*, *Orthoceras asciculare*, *Orthoceras Steinhaueri*, *Acanthodes*, *Elonichthys Egertoni*, *Megalichthys Hibberti*, and *Rhizodopsis sauroides*. In it there were also occasional traces of plants, among which were *Lepidodendron* sp., *Neuropteris heterophylla* and *Neuropteris* cf. *rarinervis*.

There was a further bed at 130 feet below the Melton Field coal, and 352 feet above the Barnsley coal, but the only shells found in it were *Pterinopecten* and *Lingula mytiloides*, some of the latter being remarkably small, and others remarkably large Fish fragments were plentiful, and included *Acanthodes Wardi, Pleuroplax Rankinei, Cœlacanthus elegans, Rhadinichthys monensis,* and *Rhizodopsis sauroides.*

The fourth bed occurred at 111 feet above the Barnsley coal. It contained *Lingula mytiloides.* There were also fragments of fish including a scale which was probably *Rhizodopsis sauroides.* In close proximity to this bed there were found *Spirorbis, Carbonicola* var. *aquilina,* and *Naiadites modiolaris.*

The fossils have been submitted to, and named by Dr. Wheelton Hind, Dr. A. Smith Woodward, and Mr. R. Kidston. Thanks are due to them for the trouble taken, as also to Mr. Walcot Gibson for guidance and assistance in the work, and to the Brodsworth Colliery authorities for the facilities given in examining the ground passed through.

◆

Memorials of Old Shropshire, edited by **Thomas Auden, M.A., F.S.A.** London: Bemrose & Sons. 302 pp., 15/- net.

Messrs. Bemrose have produced a volume dealing with Shropshire, which contains a series of interesting chapters by various authors, which trace the history of the county from the earliest times. Palæolithic remains are unknown, but Neolithic, Bronze Age and early Iron Age relics occur, and are preserved in the Museum at Shrewsbury. (In the peasantry of Shropshire the editor recognises the three earliest types of men which prevailed in Britain). Passing on to Roman times, reference is made to the Roman city Uriconium, on the site of which monuments have been found which shew that its foundation dates from the time when Ostorius Scapula was engaged in a final effort to subdue the British chief Caractacus. Later still we find a reference in the Anglo-Saxon Chronicle to 'Scrobbesbyrigscire,' that is to say Shrewsburyshire, indicating that formerly, as in the case of Gloucester and Worcester, the shire was called after the principal town. In this connection we may mark in passing, that nothing could be a more striking witness to the former importance of Shrewsbury than the map facing the first page. Roads from every conceivable point of the compass are shewn, like the spokes of a wheel, leading *into* Shrewsbury, not one goes straight through it. Bearing upon this is Henrietta M. Auden's instructive essay upon 'the origin and evolution of towns.' Mr. J. E. Auden deals with 'Shropshire in the Civil War,' and 'Shropshire and its Schools.' Other chapters refer to the Religious movements, Folk Lore, Ludlow and the Council of the Marches, Old Spropshire Families, Representative Buildings, and Illustrious Salopians. The work is fittingly illustrated by Katharine M. Roberts, and the Index, for which the editor is indebted to an anonymous friend, is exceptionally good and complete.

The **Transactions and Journal of Proceedings of the Dumfriesshire and Galloway Natural History and Antiquarian Society,** Vol. XVIII., Part 1 (Standard Office, Dumfries, 4/-). is a substantial work of over 250 pages. A fair proportion of the papers is of distinct local value. The articles are too numerous to quote, but they deal with various branches of natural history, archæology, etc. Perhaps the most important paper is 'The Castle of Dumfries,' by James Barbour, F.S.A. Scot.

LINCOLNSHIRE FRESH-WATER MITES.

C. F. GEORGE, M.R.C.S.
Kirton-in-Lindsey.

In former papers in 'The Naturalist,' I have recorded eight species of Curvipes as found in Lincolnshire. I now wish to increase that number by additional nine, as follows:—

1. *Curvipes rotundus* (Kramer.)
2. ,, *alatus* (Sig. Thor.)
3. ,, *fallax* (Karl Thon.)
4. ,, *discrepans* (Kœnike.)
5. ,, *nodatus imminutus* (Piersig.)
6. ,, *circularis* (Piersig.)
7. ,, *pauciporus* (Sig. Thor.)
8. ,, *elegans* (Soar.)
9. ,, *uncatus* (Kœnike.)

These mites, with a few others have been well figured and described by Mr. Soar, in a paper published in the 'Transactions of the Edinburgh Field Naturalists' and Microscopical Society,' Session 1906-1907. Mr. Soar discards the old name 'Curvipes,' and uses 'Piona,' a name applied to these mites by the late Professor Piersig, of Annaberg, Germany. I should advise all British Students of Water Mites to obtain and study this capital essay.

Arrhenurus nonforpicatus. — A Correction. — In the 'Naturalist' for 1903, p. 252, I described as a new water mite *Arrhenurus nonforpicatus.* Since that time I have found two more specimens, and doubting whether they were mature, I kept them one month and two days, when one of them died (the other I killed for mounting). During this time development had proceeded far enough to satisfy me that they were really specimens of *Arrhenurus forpicatus. Nonforpicatus* must therefore be deleted from the list, or simply used as a synonym or to indicate a certain stage of growth of *A. forpicatus.*

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Northampton and its Surroundings, by **S. S. Campion, J.P.** The Homeland Association, 22, Bride Lane, Fleet Street, E.C. 112 pp., 6d.

This is a well-written and well-illustrated handbook to Northampton, and with it the visitor can easily see what is worth seeing. There is also a good plan. From the title page we learn that there are 'Notes on the Geology of the District,' by Beeby Thompson; on the 'Botany of the District,' by H. N. Dixon, and on the 'Ornithology of the District,' by Rev. W. A. Shaw. As, however, these articles only occupy one small page each, they might almost as well have been omitted.

THE FOSSILIFEROUS DEPOSIT AT BIELSBECK, EAST YORKS.*

As was intimated in our report for 1905, the work during the past year has been directed to the investigation of the deposit at Bielsbeck, or Bealsbeck, in the Vale of York, which was examined between seventy and eighty years ago by the Rev. W. V. Harcourt, and yielded the remains of numerous extinct mammals. The object of our investigation was mainly to ascertain if any further evidence could be obtained to show the relation of this fossiliferous deposit to the glacial drifts.

The work, which was carried out under the superintendence of Professor P. F. Kendall, Messrs. G. W. B. Macturk, Thomas Sheppard, and the Secretary, confirmed the statements of the previous observers: (1) that the deposits yielding the bones rested immediately on the Keuper Marl; (2) that they have been accumulated in a boggy hollow on an old land surface; and (3) that at this particular locality there is no material that can be assigned to the direct agency of ice. It therefore still remains a debatable question whether the bone-bearing material was accumulated before, during, or since the Glacial period; and it would appear that the elucidation of this matter will depend upon the investigation of a wide area to determine what was the condition of the Vale of York during that period.

The absence of glacial deposits in this part of the country may, on the one hand, imply that the area was never glaciated; or, on the other hand, it may mean that glacial deposits once existing have been entirely removed. If the former be the case, the bone-bearing deposits might belong to the pre-Glacial or to any younger stage; while if the latter supposition should find confirmation, the deposit must be later than the glaciation.

The site of the original excavation is still visible, the hollow from which the 'marl' was dug being now a reedy pond. The new sections consisted of four pits sunk in the vicinity of the pond.

These pits were roughly from two to four yards square, and were carried down until the Keuper Marl was reached, or the work was stopped by the influx of water. They were supplemented by several bore-holes put down to determine the extent of the deposit.

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* Investigation of the Fossiliferous Drift Deposits at Kirmington Lincolnshire, and at various localities in the East Riding of Yorkshire.—Report of the Committee of the British Association, consisting of Mr. G. W, Lamplugh (*Chairman*), Mr. J. W. Stather (*Secretary*), Dr. Tempest Anderson, Professor J. W. Carr, Rev. W. Lower Carter, Dr. A. R. Dwerryhouse, Mr. F. W. Harmer, Mr. J. H. Howarth, Rev. W. Johnson, Professor P. F. Kendall, and Messrs. G. W. B. Macturk, E. T. Newton, H. M. Platnauer Clement Reid, and Thomas Sheppard. (Drawn up by the Secretary).

The sections revealed in the pits were as follows :—

Section 1.

	Feet.	Inches.
Surface soil	0	9
Sand, with small pieces of angular chalk and flint	2	0
Gravel of rounded chalk and sub-angular flint	1	6
Silty blue-black marl or loam, the upper surface very irregular and penetrated by 'pipes' and pockets of gravel from the bed above	3	9
Marl as above, with specks of vivianite	1	0
Black marl	6	0
Lighter-coloured marl, passing downwards into gravel (chiefly flints)	7	6
Total depth reached	22	6

Section 2.

	Feet.	Inches.
Surface soil	0	9
Sand	1	9
Gravel	2	0
Dark silty marl, with gravel	2	6
Dark marl	4	0
Lighter marl	4	0
	15	0

Section 3.

	Feet.	Inches.
Soil	1	0
Sand	2	0
Gravel	3	0
Grey marl, passing downwards into black	7	6
Coarse gravel	0	6
Solid Keuper Marl, blue	3	0
Solid Keuper Marl, red	1	0
	18	0

Section 4.

	Feet.	Inches.
Soil	0	9
Sand	3	6
Gravel	1	6
Keuper Marl, its surface dipping at 1 in 3 towards the old marl pit	1	3
	7	0

From the black muds or marls which occurred below the superficial gravels in these pits the following fossils were obtained :—

Bones.—For the following determination we are indebted to Dr. C. W. Andrews, F.R.S., of the British Museum (Natural History), South Kensington.

Mammalian Remains.

Cervus sp.
Bos sp. (two vertebræ).
Bos sp. (smaller than *longifrons* or *primigenius*).
Bos primigenius.
Elephas (rib and left scapula).

The bones were not confined to any particular layer, but were distributed sporadically throughout the mass of the marl. The overlying gravels, however, contained neither bones nor other vestige of contemporaneous life, possibly because of their removal by percolating water.

Shells.—The molluscan remains distributed through the marl belong to existing land and fresh-water species, many of which are still living in the neighbourhood. They are all species of wide range, and afford no definite indications as to climate. These species, kindly determined for the Committee by Mr. J. W Taylor, of Leeds, are as follows :—

Mollusca.

Limnæa peregra.
,, *palustris.*
,, *truncatula.*
Succinea putris.
,, *elegans.*
Hyalinia nitidula.
Xonites fulvus.
Helix nemoralis.
,, *hispida,* var. *concinna.*
,, *pygmæa.*
,, *pulchella.*
Vertigo antivertigo.
,, *pygmæa.*
Cochlicopa lubrica.
Carychium minimum.
Pisidium amnicum.
,, *pusillum.*
,, *nitidum.*
,, *milium.*
,, *obtusale.*
Bythinia tentaculata.
Valvata cristata.
Planorbis spirorbis.
,, *contortus.*
,, *glaber.*
,, *marginatus.*

Plants.—The material also contained plant remains, but was difficult to wash and sift. Some small seeds were, however, picked out by Mr. Stainforth, and were submitted to Mr. Clement Reid, F.R.S., for determination, who recognised the following :—

Seeds of Plants.

Ranunculus sceleratus.
,, *repens.*
Viola sp.
Œnanthe aquatica Poir.
Rumex.
Sparganium erectum ?
Carex.
Alisma plantago.

With regard to the above list Mr. Reid remarks : 'If these were all that were found at Bielsbeck, they are an exceptionally poor set, which shows nothing as to climatic conditions. There are only one or two seeds of meadow plants among them, and no dry soil plants.'

INSECTS.—Besides the above, the deposit contains the remains of beetles, but much of the material has not yet been specifically determined. The following may be mentioned :—

COLEOPTERA.

Donacia (sp. ?) (an almost complete specimen).
Hister (sp. ?) (elytron).

FURTHER NOTES ON THE DEPOSITS.—The Bielsbeck boner bearing deposits apparently occupy a depression or hollow in the Keuper Marl, of undetermined width, and it appears as though this hollow is isolated and inclosed by the marl, though it is just possible that it may represent a portion of a filled-in valley or trench, the direction of which has not been traced.

Scattered through the marl at various depths were angular or slightly rounded black flints in large numbers, and these in some cases formed a definite layer. Along with the flints were occasional pebbles of quartz and of sandstone (probably Carboniferous). None of these pebbles showed striæ or other indication of glacial action.

The overlying gravel was mainly composed of flint and chalk from the neighbouring Wolds, along with scattered fragments of quartz, sandstone, etc. (like those found in the underlying marl), and *Gryphæa* and other fossils from the Lias. This gravel is the feather-edge of a wide fan, which can be traced up to the mouth of a valley that drains from the Wolds at Market Weighton. In the thicker parts of this gravel, towards the mouth of the valley, other pebbles besides the above have been detected, including the well-known porphyrite which is characteristic of the upper part of the East Yorkshire drifts. The wide extent and depth of this gravel suggests that it has been spread out by floods from the melting ice, when the ice-margin abutted upon the eastern slopes of the Wolds. The present valley appears to be too short to supply a stream powerful enough to spread a sheet of gravel of these dimensions.

[By a resolution of the Committee, the collections from the recent excavations have been presented to the Hull Museum].

1908 February 1.

COLOUR PHOTOGRAPHY OF ROCK SECTIONS UNDER POLARISED LIGHT.

J. W. PATTERSON, F.C.S.,
West Hartlepool.

The photography of rock slices under the microscope when polarised light is used has always been disappointing, the beautiful polarisation colours being incapable of registration by the process. The 'Plaques Autochromes' of Messrs. A. Lumière & ses Fils have now made it possible to reproduce these colours with certainty and truthfulness. In obtaining them the usual arrangement of microscope and camera was used. An arc light was the source of illumination, and various objectives from $\frac{1}{6}''$ to $4''$ were employed. In some cases no eyepiece was used; in others a low power 'A' eyepiece was found useful. In the microscope, a Swift's Petrological, the analyser slipped in and out of the tube, and the polariser was in the usual position beneath the stage. When a Bertrand Lens was required, this was in the tube below the analyser, and an eyepiece was needed. The hemispherical lens required for the convergent light fitted into the stage. The yellow screen, necessary for use with these plates, was so fixed in the camera that the light passed through it last, unless an eyepiece was being used when the screen was placed in front of the polariser.

The instructions issued by the makers were followed, and there seems good reason for adhering to their rule to develop for exactly $2\frac{1}{2}$ minutes in complete absence of light. The manipulation in total darkness is so simple, that no one can feel any inconvenience, and the extremely delicate and sensitive film seems to require this care. Notwithstanding its thinness, the film shows no tendency to 'frilling,' and takes its different treatments in a most docile manner. The exposure required for these plates is not great, and poor results are obtained by over-exposure, which is certainly the unpardonable sin here, for detail is lost, and feeble colours result. Much light is cut off by the rather numerous optical appliances, especially the polariser; but from 17 to 20 seconds was found to give the best results with the apparatus used. Correct exposure seems to be an important detail in the process, and as the time for development is fixed by other considerations, the reason is plain.

To test the faithfulness with which the plates had recorded the colours, the yellow screen was removed, and the colours on the plate compared with those on the ground glass of the camera —their identity was striking. This was tried because it had been previously observed that the screen shortened the spectrum of ordinary daylight more than that of the arc-light, which extends considerably further at the more refrangible end. The only difference which this seems to make is that it shortens the exposure appreciably.

While these photographs were being taken, an interesting experiment was tried by Mr. J. Archyll Jones, B.Sc., the Principal at the Technical College. An ordinary lantern plate was exposed and developed as the colour-plates are, except that ruby light was used in the dark room; the image was then treated with the acid permanganate, washed, developed for a second time, then fixed with 'Hypo' solution such as is generally employed for fixing plates. The result was a fine positive, obtained direct.

To further test the colour process, a selenite plate was placed in front of the objective. This, of course, changed the tints, giving at times most beautiful results; but the plates recorded even these exquisite colours, and a fine photograph of Luxulyanite was obtained under these conditions. When working with the higher powers, as when interference-figures are being photographed, some little care has to be taken with the alignment of the beam of light and the axis of the micro tube; but a crystal of Aragonite cut at right angles to the acute bisectrix, and placed so that its opticaxial plane made an angle of 45 degrees with the principal sections of the Nicols, which were crossed, readily yielded its familiar figure in its true colours. Any descriptions of these plates, without illustrations in colour, is indeed 'Hamlet,' without the 'Prince of Denmark': so I forbear.

I have not yet tried a photograph of the spectrum, but it does not seem likely that the plates would fail even there.

Guide to the Specimens of the Horse Family (*Equidæ*) exhibited in the Department of Zoology, British Museum (Natural History). London, 1907. 42 pp., price 1/-

The Trustees of the British Museum are certainly earning the gratitude of all naturalists by the way in which they are placing work of this character in the hands of the public at so small a cost. Mr. R. Lydekker has written the present Guide. It is a fascinating narrative, full of facts of value to the student of evolution, and is illustrated by twenty-six figures.

In Memoriam.

NICHOLAS FRANK DOBRÉE.

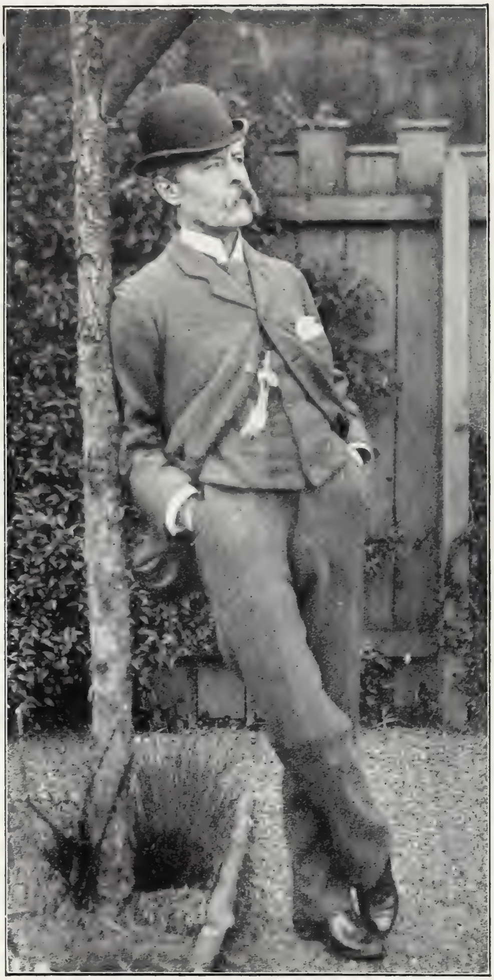
(PLATE VII.)

Lepidopterists, and indeed naturalists generally, will hear with great regret of the death on January 8th last, at the advanced age of seventy-seven, of Mr. N. F. Dobrée, of Beverley. Formerly a regular attender at the excursions of the Yorkshire Naturalists' Union, the older members will remember him as one of the most pleasant and genial of companions in field work; but it was as an ardent student of the Noctuæ of the European fauna, that he was best known throughout the country. Taking but little interest in the other orders of the lepidoptera, he was greatly fascinated by the Noctuæ, and especially with the great variation in the forms shewn by the geographical distribution of species throughout Europe. His collection of European Noctuæ was known as one of the best in the Kingdom, probably *the* best private collection, and it is fortunate, especially for Yorkshire lepidopterists, that as advancing years brought a natural diminution in his collecting energy, his generosity prompted him to present the collection to the Hull Museum, where it can now be consulted by anyone interested in the Noctuæ. Hull was no doubt chosen for its location, because for many years, and up to the time of his death, he was in business there as a corn merchant. We understand too, that Mr. H. B. Browne, M.A., has for a long time been at work on, and has now completed, a manuscript catalogue of the collection, in which all the varieties are described in detail, and references made to the published figures. This is to be printed shortly, and will of course add to the interest and value of the collection. How closely Mr. Dobrée must have studied the Noctuæ of his own district of Holderness, a reference to the 'List of Yorkshire Lepidoptera' will testify. Mr. Dobrée took little interest in public work, but at one time was greatly interested in the local scientific societies, and during the years 1884-5-6, was President of the Hull Field Naturalists' Society.

G. T. P.

Mr. Browne, has kindly supplied the following additional information :—

BRITISH MUSEUM NATURAL HISTORY



W. Tobin

Beverley 8 Sept/907

Mr. Dobrée's Contributions to 'The Naturalist':—

1880-81	On certain species of East Riding Lepidoptera.
1881-2	The Waxwing at Beverley.
	Dasypolia templi at Beverley.
	Fork-tailed Petrel at Beverley.
	Occurrence of certain species and varieties of Lepidoptera at Beverley, Hull, and Spurn.
	Gadwall and Garganey near Beverley.
	Bank's Oar-Fish and Deal-Fish at Bridlington.
1883-84	Fox-Shark and Porbeagles at Bridlington. Lake-Dwellings at Ulrome.
	Late mackerel and herring on the Yorkshire Coast.
1884-85	Astynomus ædilis at Hull.
	Mammalian Remains at Kelsey Hill.
1888	Sirex juvencus at Hull.
	Report for Entomological Section of the Y.N.U. at Market Weighton (August 6th).
1897	The Stone Curlew formerly breeding in E. Yorkshire.
1901	Acronycta alni at Beverley.

Mr. Dobrée's Contributions to 'The Entomologist':—

June, 1875	The Occurrence of Eupithecia extensaria at Hull.
Mar. 1878	Acronycta myricæ—(?) an insular form of A. euphorbiæ.
April, 1879	Identity of Crymodes exulis and Hadena assimilis.
May, 1884	The Varieties of Epunda lutulenta. (In this paper Mr. Dobrée very happily expressed his interest in the Noctuae in the following words:—'My amusement consists in collecting specimens of our insular Noctuae from different parts of Europe.')
Feb. 1887	**On Melanism.*
June, 1887	A New Method of Sugaring.
Nov., 1887	Sphinx convolvuli at Beverley and Hull.
Dec., 1887	*Agrotis fennica* (This article established the great difference that exists between the two sexes of this species. The ♀ was previously unknown.)
April, 1890	Agrotis ashworthii, Doubl. = A. candelarum, Staud.
Nov., 1890	A new variety of Plusia moneta occurring in Amurland.
	A Plague of Liparis monacha in Southern Europe.
June, 1891	Cucullia scrophulariæ probably specifically identical with C. lychnitis.
June, 1892	A Hint to Breeders of Lepidoptera—Continental method of keeping cuttings of hollow-stemmed plants fresh.
May, 1893	The Hairs of Acronycta alni Larvæ.
July, 1894	Spilosma mendica var. rustica and Amphidasys betularia var. doubledayaria on the Continent.

Mr. Dobrée's Contributions to other Papers:—

'The Beverley Recorder,' April 3rd, 1886, leading article—'What is a Naturalist?'

'The Standard,' April 30th, 1886, leading article—'The Death of Thomas Edward, the Banffshire Naturalist.'

Presidential Address to the Hull Field Naturalists' Society 1885.

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* This article was the author's most important contribution to entomological science. At its close he expressed his views with regard to the cause of Melanism thus:—'The inference can be drawn that we originally owe our insular fauna to migration from the south, and that melanism is primarily due to the peculiar geographical position of these islands . . . . Yorkshire melanism may be treated as merely local aberration, not affecting the general question.'

How valuable were the results attending Mr. Dobrée's keen study of the European Noctuæ is well shown in the following extracts from Mr. J. W. Tutt's 'Melanism and Melanochroism in British Lepidoptera,' written in 1891:—

'In these discussions [on the origin and distribution of melanism], the subject was generally treated from an insular point of view, until Mr. Dobrée (' Entomologist,' xx. pp. 25-28) endeavoured, by comparing our melanic forms with the forms of the same species obtained on the Continent, to correlate the facts obtained, and to shew the real relation that not only our melanic, but also our ordinary forms, bore to the Palæarctic lepidopterous fauna, and to deduce reasons for the melanism so prevalent in our British forms.' . . .

'Our greatest authority on Continental Noctuæ, Mr. N. F. Dobrée, wrote an article (' Entomologist,' xx, pp. 25-28), previously referred to, disproving the general notion that melanism was characteristic of high latitudes, and pointing out the following facts:—

(1) That melanism scarcely ever occurred in such latitudes;

(2) That at any latitude, dry open areas produced more brightly and clearly marked forms of ledidoptera; and

(3) That the North of Europe produced, practically, no melanic forms, neither did the South, but the melanism of the Continent was confined almost entirely to certain Alpine districts.

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ENTOMOLOGY.

Mablethorpe Insects.—In August last Mr. F. Rhodes collected a number of insects at Mablethorpe, Lincs. These he sent on to me, and amongst them are:—

Coleoptera.—*Ilybius obscurus* Marsh., *Philhydrus testaceus* F., *Laccobius alutaceus* Thoms., *Oxytelus inustis* Grav., *Athous longicollis* Ol., *Donacia sericea* L., *Lagria hirta* L., *Nacerdes melanura* L., *Philopedon geminatus* F., *Barynotus elevatus* Marsh.

Neuroptera. — *Pyrrhosoma nymphula, Ischnura elegans, Agrion pulchellum.*

Hemiptera.—*Hydrometra stagnorum.*

The full list has been sent on to the Secretary of the Lincolnshire Naturalists' Union. Messrs. W. Holland and G. T. Porritt have kindly assisted me with the identification of some of the species.—J. W. Carter, Bradford.

In Memoriam.

THE REV. W. R. LINTON.

We regret to notice the death on January 4th last, of the Rev. William Richardson Linton, at the age of fifty-seven. Mr. Linton was well known as one of the leading critical authoritiee on British Phanerogams, and especially as an expert upon ths puzzling genera Rubus, Hieracium and Salix, as to which he may be said to have had a European reputation. From the date of his settling in Derbyshire in 1887, upon his acceptance of the living of Shirley, he devoted himself to the study of the flora of the county, and the results of fifteen years of assiduous work appeared in the 'Flora of Derbyshire,' published in 1903, an account of the Flowering Plants, Higher Cryptogams, Mosses, Hepatics, and Characeae of the county. He was also responsible for the article on 'Botany' in the 'Victoria History of Derbyshire.' He was also the author of a 'Manual of British Hieracia,' and of numerous contributions to the 'Journal of Botany.' With his brother, the Rev. E. F. Linton, he issued a most useful series of Fasciculi of British Hieracia, and we believe the list of that genus in the forthcoming edition of the 'London Catalogue' is from his pen. He described and named *Rubus durescens*, a very distinct bramble belonging to the *Rhamnifolii* section, a representation of which adorns the cover of the 'Flora of Derbyshire,' also *Hieracium holophyllum*, a local hawkweed characteristic of the Derbyshire limestone hills, and a form of *Epipactis*, to which he gave the name of *E. atrovirens*. The deceased gentleman was ever ready to put his great stores of botanical knowledge at the service of his fellow botanists, and will be missed by a large circle of friends and correspondents.

T. G.

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The Sea-shore shown to the Children, by **Janet Harvey Kelman,** described by Rev. Theodore Wood. Edinburgh: T. C. and E. C. Jack. 146 pp., 2/6 net.

This is the fourth of this admirable series, and will unquestionably do much to interest children in the objects likely to be met with on the shore. No better present could be made to a child about to visit the coast than this well-illustrated and charmingly written book. There are no fewer than forty-eight coloured plates, upon which fishes, shells, crustaceons, sea-weeds, etc., are admirably depicted. Most of the drawings are all that can be desired; one or two are weak, the 'Sea-urchin without spines' (plate 38) being perhaps the worst. Anyone who does not consider this a cheap book should be made to repeat its title, quickly, six times!

In Memoriam.

ROBERT LAW, F.G.S.

Born 21st June, 1840, Died 29th December, 1907.

(PLATE VIII.).

It has been said that ' the besetting sin of a friendly biographer is to overpraise the subject of his sketch, and, in particular, to magnify the promise of his early days.'

The subject of this memoir, in his earlier years, so far as we can learn, gave few, if any, signs of ever becoming interested in knowledge or science: on the contrary, at the age of fourteen he could neither read nor write, and was considered to be the dunce of the family; indeed, thus far, neither heredity nor environment appeared to favour the development of the boy into an ardent and devoted votary of geology.

Robert Law was born 21st June, 1840, at Hollingworth, Walsden, Todmorden. His father was a handloom weaver, with a family of ten children of whom Robert was the youngest. At an early age he began to work full time in a Walsden Cotton Mill, where his backward education, due to truanting, etc., laid him open to the taunts of his co-workers, and these, supplemented by the reproaches of his brothers and sisters, seem to have spurred him on to the resolution, if it were possible, to educate himself. He at once carried out this intention by joining a night-school, which he diligently attended for some years. So enamoured did he become of study, that he threw himself with ardour into every local effort for the promotion of learning; identified himself with the active work of the Walsden Institute, and for sixteen years was intimately associated with its growth and development. His walks in the country were made with a purpose, and he even took lessons from a Todmorden taxidermist in the art of skinning and preserving birds. Whenever he came across any curiously marked stone, he placed it amongst a collection which he was sorting in cupboards and boxes, and as this became too bulky, he was compelled to turn all out into the garden to adorn a rockery.

All this time Robert had no idea that there was such a science as geology, or that his liking for curious rocks and stones had any relation to it.

Robert Law.

BRITISH MUSEUM NATURAL HISTORY

One day, he happened to hear a friend read an article on 'Dr. Buckland and his method of studying geology, and an account of the doctor's travels on horseback from quarry to quarry in search of fossils.' A friend borrowed an elementary and popular work for him from a neighbouring library, and over this he pondered, trying hard to understand its mysterious phraseology. The result was a settled and firm idea that he would devote all his spare energies to this fascinating branch of study.

His first step was to inspect the neglected fossils on his rockery, and his next one to traverse the district in every direction, and in every spare moment to study the rocks personally in the field.

At the evening science classes he learned the rudiments of Chemistry, and of some other natural sciences, but geology was ever his favourite study, and so enthusiastic and thorough were his labours, that he was at last selected for a course of study at South Kensington.

Some little time before he took up the study of geology in earnest, he had tried his hand at rhyming, and one of his efforts describes the finding of his first fossil. The first verse ran thus :—

'O ancient relic of the bye-gone days,
  Come let me clutch thee with my eager hand
Strange thoughts arise as on thy form I gaze,
  Thou dost my mind expand ;
Thoughts of the past, when thou wert but a bud,
  And nestled in some forest giant's arms,
Who held thee high above the surging flood,
  From Nature's fierce alarms.

The favourite hunting grounds for fossils of our young geologist were the coal pit tips, the quarries and ravines of Lancashire and Yorkshire. On one of his excursions he had the good fortune to meet with Captain Aitken, F.G.S., of Bacup, who opened out a new world to our friend—introduced him to a wealth of scientific literature hitherto undreamed of, and personally presented him to Professor Boyd Dawkins, F.R.S. of Manchester, and to Messrs. Davis and Spencer, and the writer, of Halifax, and to many others.

Now his outlook and sympathies began to broaden and deepen ; his work became more intelligent and systematic ; he soon qualified as a certificated teacher under the Science and Art Departments ; opened a class in geology at the Walsden Institute in September, 1878. His teaching was plain, effective, almost compelling, and he soon extended his labours to Bacup, Halifax, Hebden Bridge, Huddersfield, Oldham, Rochdale, and other towns. He was very successful in passing his pupils; in exciting in them a lively interest in Geology, and in winning their enthusiastic regard.

The following appreciation by an old student, Mr. F. Dewhirst, may prove of interest. (*Todmorden Advertiser*, 3rd January, 1908):—

> ' Though more years have passed than one cares to remember since our " evening-school " days, how vividly has Mr. Law's personality remained, despite new scenes and impressions! What a potent force there was in our old geology teacher to draw us week after week to his fascinating discourses couched in such forceful, homely phrases.
>
> Not even the glamour of Mr. Abm. Crossley's electrical wonders, or Mr. Stenhouse's chemical marvels, or even the absorbing dissections of Mr. Langstreth, could for long draw us away from " rocks and fossils." Irreverent we were and lacking in obedience to constituted authority, but somehow Mr. Law could claim even our wandering attention. Well we knew how laboriously our teacher had toiled to acquire the knowledge he was so generously giving to us; how even the odd moments at the looms had been utilised through an open text-book in the cop basket.
>
> But best remembered of all are the field excursions—when equipped with hammers and chisels, we wandered forth in the search of treasures new. No geological feature was ever allowed to pass without a careful description. Mr. Law knew all the hunting grounds. He knew where the flints could be found above Wardleworth; where the *lingula* bed was in Green's Clough; where the best finds could be made in the shale pile at Cloughfoot; where the encrinites were at Clitheroe; and could guide us along the " way " of the glaciers on the moors on the Blackstone edge side. And when we made a " find," how patient he would be about our often absurd identifications.
>
> Our greatest treat was to be asked to go to his home on the hill above Walsden Church (Hollingworth, I believe), to see his geological collection. What wonders he showed us! How lovingly he handled his specimens! And how generously he shared his duplicates! And, last of all, he would show us his Canadian collection, and tell us of his trip with the British Association, and (culminating joy!) give us a wee fragment of that most ancient of fossils—Eozoon Canadense.
>
> Never while memory lasts can we forget " Bob " Law, and justly and well may he be called the " High Miller " of these mountains and valleys of ours.'

He now diligently worked out the sequence of the rocks of Walsden and the surrounding district, and constructed sections and diagrams thereof before any of the geological maps came under his notice, at the same time collecting and studying the local fossils.

He began to extend his visits to more distant fields. One of his earlier favourite districts was Derbyshire, where he collected Carboniferous Limestone fossils, and where, at a later date, he discovered at Matlock Bath a cave containing bones of extinct mammalia, and is said to have found the first remains of the cave bear in that part of the county. From the Mountain Limestone of Castleton, in Derbyshire, and of Clitheroe, in Lancashire, his wanderings widened, until finally he visited the Lias districts of the East Coast of Yorkshire, and a great part of Great Britain and Ireland, and even caused the mountains of Switzerland and Canada to echo to the sound of the strokes of his hammer.

Prehistoric Archæology had a great charm for him. In 1879, in company with Mr. James Horsfall, he began to search the moorlands for flint implements. The results of the labours have been recorded in the following papers :—

1882. ‘On the Discovery of Flint Implements on the Hills between Todmorden and Marsden.’

1884. ‘An account of small Flint Instruments found beneath Peat on the Pennine Chain.’

Further papers written by himself alone, are :—

1897. ‘Evidences of Pre-historic Man on the moorlands in and around the parish of Halifax.’

1897. ‘Mounds on Norland Moor, Halifax.’

1898. The Discovery of Cinerary Urns at Todmorden.’

Glacial Geology, too, occupied much of his time and thought, and he especially studied the glaciology of the Calder Valley, and the evidence of glaciation afforded on the sinking of a foundation for a gasometer near Todmorden.

In his younger days, Darwinism and Evolution were being keenly discussed. He was an early believer in and defender of these theories, and ‘maintained a very spirited and novel controversy in verse on the subject with one of his contemporaries—the effusions being pinned up at the back of the Institute door, to the great amusement and edification of the rest of the members.’

Perhaps his most successful collecting excursions were those made in search of Carboniferous fossils. When visiting the geological collections in London, he was particularly interested in these, and there and then came to a clearly defined and firm decision that on this group of fossils he would specialise, and devote to them the powers and energies of his life.

Mrs. Law, referring to the happy annual trips made for many years to collect Carboniferous fossils along with her husband in the Isle of Man, says :— ‘My late husband commenced collecting Carboniferous fossils at Poolvash, in the south of the Isle of Man, in 1888, and continued this work, making some fourteen yearly visits, until 1901. He spent three or four weeks each year during the months of July and August, collecting these. In the mornings he would walk from Castleton to Poolvash Bay, and return nightly with a large bag of fossils on his back.'

'His tools were crow-bars, a six-pound hammer, and several smaller ones; occasionally, to get at new material, he would engage men to drill holes in the limestone rock, which he would then blow up with the aid of gunpowder. I can see in my mind's eye our rushing excitedly forth, after an explosion, to see what fossil treasures had been brought into the light of day.

'After a holiday thus spent, my husband and I would return home with a hundredweight or more of fossils for investigation and study until our next excursion.

Our entire days when at Poolvash, were spent in breaking up the rocks, and selecting what we thought to be the rarest or most perfect specimens.' While at Poolvash he also collected a large number of worked flints, such as scrapers, knives, and cores. These were found in the ploughed fields close to Poolvash.

One of the most interesting discoveries made at Poolvash was a new form of Carboniferous nautiloid shell. It was found in the Poolvash limestone, and has been described by Dr. G. C. Crick, F.G.S., who refers the specimen to a new genus. A description of it is given in the 'Proceedings of the Malacological Society, Vol. vi., part 3' September, 1904. The author there says :—'I feel compelled to regard it as a new genus. On account of its form I propose for this genus the name *Amphoreopsis*, and in allusion to the fewness of the cameræ (or so-called air chambers), suggest as the trivial name *paucicamerata*.'

There is a little incident connected with the collection of this fossil which admirably illustrates the thoroughness, patience, and dogged perseverance so characteristic of Mr. Law. The specimen was found among the debris left after blasting the Poolvash limestone with gunpowder, as previously described. At first, only the lower portion of the fossil was found, but with distinct evidence that the upper portion had been broken off and lost by the impact of the explosion. For nigh on three days every particle of the debris and rubbish was carefully and patiently examined, until finally the missing portion was found and triumphantly joined on to the original find.

In a note to Mr. Lamplugh's 'List of Carboniferous Fossils from the South of the Isle of Man,' published in 'The Geology of the Isle of Man,' it is stated that 'Mr. Law informs us that he obtained from the Poolvash limestone an Orthoceras four feet in length, and twenty-nine inches in circumference. This specimen lay flat in the limestone, and was not distorted; it is probably an *Actinoceras*.'

In 1884 he visited Canada and the United States, calling at Newfoundland, Nova Scotia, Prince Edward's Island, Quebec, Montreal, Toronto, Hamilton, Niagara Falls, Merriton, Kingston, Lakes Huron and Superior, Port Arthur, Winnipeg, Brandon, Calgary, Laggan, Stephen, British Columbia, Ottawa, Hudson River, New York, New Haven, Philadelphia, and Baltimore—ever observant, and collecting specimens and ideas, flints and fossils, He culled a rich harvest, and met with some curious adventures, being even set upon by thieves, but he passed through all unscathed. He read a paper before the British Association on its meeting at Montreal, and also visited the American Association.

In 1886 he was elected a Fellow of the Geological Society, and the same year witnessed his marriage to Miss E. A. Blackburn, a former geological pupil of his, who proved a real helpmeet to him, entering with full interest and sympathy into all his scientific tastes and public labours. For a time they resided in Halifax, at Cromwell Terrace. Some few years later Mr. Law retiring from his profession as science teacher, they removed to Fennyroyd Hall, Hipperholme.

During this same year of 1886, many of Mr. Law's old pupils at Hebden Bridge presented to him a beautiful binocular microscope and accessories, valued at £40.

Six years ago he was elected a member of the Hipperholme District Council, where his services were appreciated.

Some years ago an attack of rheumatic fever must have left traces of its effect on his strong constitution, for on Sunday night, the 29th December, 1907, after a few days' illness from congestion of the stomach from which he appeared to be nicely recovering, he was suddenly seized with a relapse, which culminated sadly in his decease.

Mr. Robert Law left many friends who held his sturdy, upright character in high estimation. He was genial and social in disposition; of science he almost made a religion. The most rigid accuracy and carefulness in his scientific work is shown by the care with which he collected the data respecting his fossils. He was intolerant of all shams and pretence, and held in the highest regard every lover of nature, whether rich or poor.

We annex a letter from Dr. Wheelton Hind, the President of the Yorkshire Naturalists' Union, who has kindly favoured us with his impressions on the late Robert Law:—'I have not much to say, except that he generously placed the whole of his collection of Carboniferous lamellibranchiata at my disposal for my monograph, when in preparation for the Palæontological Society. I went to his house on more than one occasion and selected the specimens. In the family of the Pectenidæ, his collection was of the utmost service. His specimens were carefully labelled, and his localities trustworthy. He was most anxious at all times that his collection should be used for scientific purposes. Whenever he spoke on geological questions, his remarks were always to the point, showing what a grasp he had of the subject, and how carefully he had gone into the field work and stratigraphy.

His collections have been of great service to the Geological Survey, especially in the Palæontological lists compiled by Mr. Lamplugh for the memoir on "The Geology of the Isle of Man."'

The intense love of Mr. Law for geological science and the high regard in which he held the Geological Society of London are shown by the fact that by his last will and testament, he gives to the Natural History Museum, South Kensington, his Carboniferous Limestone fossils, and also gives £1000 to the Geological Society, London, under conditions, as shown in the following extract from his will, communicated to us by Mrs. Law:—'And I give to my said wife the free and undisturbed use during her life-time of my carboniferous limestone fossils, and from and after her death I give the same to the Natural History Museum at South Kensington, it being my desire that they shall be kept as "The Law Collection." And from and after the death of my said wife, I give to the Geological Society at Burlington House, London, the sum of £1000, to be paid the President, Secretary, or Treasurer, for the time being of such Society, it being my desire that such sum shall be invested, and the income utilised in annually purchasing a medal called "The Law Medal," to be given to practical geologists of any nationality in furtherance of geological research, and to such persons as the Council of the Society may think most worthy of it, and any surplus of the said interest may be used in the furtherance of geological research as the Council of the Society shall think proper.' Mr. Law, leaving no children, his widow is left alone to mourn her sad loss, but, in her sorrow, many sympathising friends sincerely share.

His chief published papers are as follows :—

1882. 'On the Discovery of Flint Implements on the Hills between Todmorden and Marsden.'—Proc. Yorks. Geol. and Polyt. Society (N.S.) viii.-70-76-(1882)—R. LAW and J. HORSFALL.

1884 'An account of Small Flint Instruments found beneath Peat on the Pennine Chain.'—R. LAW and JAS. HORSFALL.—British Association Report (Montreal), 1884, p. 924.

1887. 'On the Discovery of Carboniferous Fossils in a Conglomerate at Moughton Fell, near Settle, Yorkshire.'—ROBT. LAW, and JAMES HORSFALL.—British Association Report (Manchester), 1887, p. 690.

1897. 'Evidences of Pre-historic Man on the Moorlands in and around the Parish of Halifax.'—'Halifax Naturalist,' April 1897, Vol. ii, No. 7, pp. 1-6 ; 'Halifax Naturalist,' June, 1897, Vol. ii, No. 8, pp. 29-31.

1897. 'Mounds on Norland Moor.'—'Halifax Naturalist,' August, 1897, Vol. ii, No. 9, pp. 59-60.

1898. 'The Discovery of Cinerary Urns at Todmorden.'—'Halifax Naturalist,' August, 1898, Vol. iii, No. 15, pp. 49-52.

1898. 'Sketch of the Geology of Shibden,' 'Halifax Naturalist,' December, 1898, Vol. iii, No. 7, pp. 97-102.

W. CASH.

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We have just received the Fifth Annual Report of the Horniman Museum and Library, Forest Hill, for 1906. It is an excellent record of a good year's work, and is sold at one penny.

The Yorkshire Geological Society recently held its Annual Meeting at Sheffield. The annual report stated that the principal event of the year had been the loss of the services of the Rev. W. Lower Carter as Secretary. The new Secretaries appointed were the Rev. W. Lower Carter and Mr. Cosmo Johns.

We have received the first part of the Bulletin of the Brooklyn Conchological Club. It is well printed and illustrated, and contains several interesting notes, one being entitled, 'Shall we have an American Conchological Society'? The Bulletin is sold for 10 cents by the Kruger-Wheat Book Co., at 117, East Twenty-third Street, New York !

The Fifty-eighth Annual Report of the Ipswich Museum and Library includes several fine illustrations of Anglo-Saxon Antiquities found near Ipswich. These were exhibited and described by Miss Layard at the York Meeting of the British Association. Amongst the collection, which is unusually rich, are several finely-ornamented fibulæ.

Mr. Norman H. Joy records a new British beetle, *Cryptophagus pallidus* Sturm., in the December 'Entomologist's Monthly Magazine.' Specimens were found amongst dead leaves near Lowther Castle, Westmorland, and at Great Salkeld. In Mr. Joy's opinion there are probably several examples of *C. pallidus* amongst *C. dentatus* in collections.

The Fifth Annual Report of the Advisory Committee of the Lister Park Botanical Committee, Bradford, is to hand. We notice that the provision of plants has involved only the most trifling expense on the public funds. Nearly the whole of the plants in the Garden have been received as gifts. Teachers regularly visit the Gardens, and they are also of service to the local students.

FIELD NOTES.

ARACHNIDA.

***Meta menardi* Latreille. in West Lancashire** —Whilst examining a cave on Warton Crag, during October last year, in company with Mr. J. Wilfrid Jackson, we discovered the beautiful cocoon of this fine spider suspended from the roof. The cocoon is balloon-shaped, an inch by three-quarters in diameter, and formed of delicate pure white silk. The pale flesh-coloured eggs could easily be seen within it, as a globular mass of about a quarter-of-an-inch in diameter. It was suspended by numerous fine lines attached to the small end, giving it the appearance of an inverted balloon. We were in the cave again during Christmas week, and secured some of the spiders, which appeared to be fairly plentiful, but were mostly beyond reach, high up on the roof. They seemed sensitive to our lights, moving rapidly away when the rays of a powerful lamp reached them. In Blackwall's 'Spiders of Great Britain and Ireland,' the only locality given for this species is 'North Wales,' and to this the Rev. O. P. Cambridge, in his later work on the 'Spiders of Dorset,' adds 'Co. Durham.' This, therefore, appears to be an additional county record. —R. Standen, Manchester Museum.

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BIRDS.

Great Grey Shrike near York.—A Great Grey Shrike was caught at Strensall, near York, on Nov. 28th last. It struck at the decoy bird of some 'linnet catchers,' its wing being caught on their limed twigs. The Shrike lived two days after its capture, killing mice readily, but refusing to eat them or any other food, eventually dying of starvation. — Sydney H. Smith, York.

Stock Doves near Brocklesby.—There was an exceptionally large flock of Stock Doves near Brocklesby, in Lincolnshire, on Dec. 30th, 1907. It reminded one more of the big flocks we frequently see of Wood Pigeons.—W. H. Parkin, Shipley.

Crossbills in Westmorland.—Mr. Booth's notice of the Redwing ('Nat.,' Jan. p. 17) reminds me of a phenomenal flock of Crossbills in Westmorland some fifty odd years ago. The birds made the Brampton pine-woods, near Appleby, quite an aviary. The local naturalist (Dr. Moses, of Appleby) wrote about it in *The Times*, and offered to send specimens to Museums and collectors. I wonder if any of your readers can remember which year this was, and I should be glad to know if any similar arrivals of the Crossbill have been reported in recent years.*—CHARLES T. PRATT, Cawthorne Vicarage, Barnsley.

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MAMMALS.

Otter near Barnsley.—On the 26th December a very fine female Otter was caught on the Hoyle Mill Sewage Farm, Barnsley. It was found with its foot fast in a rabbit trap, and killed, and is being preserved for the Barnsley Naturalists' Museum.– WM. BARRACLOUGH.

Great Mortality amongst Hares in Nidderdale.—Hares during the latter months of 1907 have been dying in great numbers on several large estates in Nidderdale. Leverets especially seem to have suffered very severely. On one ramble I came across more than a dozen laid dead. I think, without doubt, that the abnormal wetness of the year has been the cause. The head keeper over one estate considers that the use of patent manures is the cause. It conduces to the growth of a somewhat rank and coarse vegetation, which physics and unduly 'flushes' the animals. Whatever the cause, there can be no doubt that the mortality has been very great.—R. FORTUNE.

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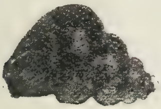
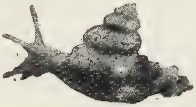
MOLLUSCA.

***Helix* (*Cepheæ*) *nemoralis*, var. *olivaceae* (Risso.) × *monstrosity*.**—Whilst collecting shells on the Sand Hills at Mablethorpe, I came across a very interesting and beautiful variety of the above; it was crawling amongst the Buckthorne near the Pull-over. It was quite perfect, and of an olive purple. The body whorl is 20 millimeters, natural height 21 millimeters, extreme height from edge of lip to apex 25½ millimeters. This is a good 10 millimeters above the average height of specimens of this species; the body whorl is about normal.—F. RHODES, Bradford.





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* For Yorkshire records see the recently published 'Birds of Yorkshire.'—Ed.

REVIEWS AND BOOK NOTICES.

A New System of Geology: With Archæological proofs of the Destruction of the World by water and fire, by **Mary Salter.** London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd., 304 pp.

As a rule we deprecate the appearance of a portrait of a writer as a frontispiece to a book. In the present case, however, we are glad that the authoress has given us her picture. It has entirely altered the method we should otherwise have adopted in reviewing her book. It has prevented us, we hope, from saying a single thing which would in any way be unkind, or hurt her feelings. We are afraid, however, that we are one of those to whom she refers in the following words: "Man is a creature of custom, and prefers to sail quietly on the old canal to being drawn out into an unknown sea." Having made this confession, she will perhaps pardon us if we decline to be 'drawn out' into the 'unknown sea' through which she would act as our pilot. Briefly, her theme may be summarised in the following 'discoveries' which she has made, and duly announced and registered at the Stationers Hall:—

(1) A red sandy bed underlies limestone and chalk; its upper surface was changed by the descent of fiery æther. June 10th, 1903.
(2) Sand was formed as sand, and deposited on the earth during the dispersion of chaos. May 14th, 1904.
(3) Radium and its transmutation into Helium had much to do with the fabrication of the outer crust of the earth and of the moon. August 3rd, and September, 1904.
(4) Metals are the result of a mixture of metallic vapours with the waters above the earth, and fell as salts in the watery mixture. February 5th, 1904, April 7th, 1906.
(5) A second manipulation by fire collected the disseminated metal. May, 1906.
(6) The history of the evolution of the Universe is to be read on the two stones known as H.V. and J.III. They are the Siriadic pillars, and contain the lore of the ancients, including Bible history. November, 1906, January, 1907.

The Manuscript was ready last year [1906], and was brought to London on May 7th, [1907].

Her various theories, should they prove accurate, would simplify many geological problems. For instance, we learn (p. 73): "Mr. Jukes Browne recognises the fact that it is difficult to separate the Permian from the carboniferous, its principal rock is the magnesian limestone . . . and the red marls and sands; *all three are the results of the cosmic downpour.*' This may be all right, but the narrow old canal down which we have been so far sailing, and on which we hope to remain, will not permit us to make the great tacks that may be taken in 'an unknown sea.' Having therefore indicated the lines upon which the book is written, we must leave it by recommending it to those 'who are not adverse to adventure, and are willing to try on its merits, any new theory which is presented to them.'

The First **Report of the Excavations on the Site of the Roman Fortress at Pevensey** has been issued (L. F. Salzmann, 10, Orange Street, W.C. 34 pp., 2/6).

By a series of carefully-planned trenches, much valuable information has been obtained relative to the nature of the fortification and the buildings with them. Carefully prepared sections shewing the details exposed in the trenches, photographs of the excavations, and of the pottery and other relics found, accompany the report. Further explorations are contemplated, towards which Mr. Salzmann, the Hon. Secretary, would be glad to receive contributions.

Part 8 of Stonham's **'Birds of the British Isles'** (Grant Richards, 7/6 net) deals with the Kingfisher, Roller, Bee-Eater, Hoopoe, Cuckoo, the Owls, etc. The drawings of the nestling owls (Plate 122) are particularly fine.

Index of Archæological Papers, 1665-1890, edited by **George Lawrence Gomme.** A. Constable & Co., 1907. 910 pp., price 25s. net.

In this excellent volume Mr. L. Gomme has once more placed the student of antiquities under a deep debt of gratitude. It is always a pleasure to find research of the character undertaken by Mr. Gomme, placed in an easily accessible form, and Messrs. Constable are to be thanked for publishing so exhaustive a record. To serious workers these bibliographies are invaluable, and save much time in search. In the present volume the author gives a list of the works he has consulted, and this at once enables anyone to see what has been omitted. It seems a pity that whole sets of the various publications were not available. For instance, of the East Riding Archæological [Antiquarian] Society, Vols. XI and XII.. only have been indexed. Surely there is a complete set of these volumes at Burlington House ? If not, there ought to be. In the list of authors also, it is somewhat surprising to find that many names do not appear at all. The name of the late J. W. Davis only appears once in the list, and Mr. J. R. Mortimer is responsible for three entries only, whereas he should have been there as the author of some dozens. (See 'Guide to the Driffield Museum,' 1890, for list). Of south country authors, however, a much more accurate bibliography is given. But the great drawback to the book is the lack of topographical and subject indexes. This the author recognises, and we share his hope that some student with more time on his hands may undertake this. To get particulars, for example, of all the papers dealing with Roman remains in Yorkshire, would mean that each entry on the 910 pages would have to be perused. The more advanced student, on the other hand, who is familiar with the names of the authors, would find the volume much more useful. But for what has been done we are very grateful. There are somewhere about 16,000 titles of papers in the volume, arranged alphabetically according to the author's name, and we can safely say that 'The Index of Archæological papers' will be a valuable addition to any public or private library.

NORTHERN NEWS.

The Wilde Medal for 1908 of the Manchester Literary and Philosophical Society has been awarded to Prof. J. Larmor, F.R.S.

The January 'Animal World' is a particularly well-illustrated number. It contains an interesting paper on 'Animals in Art,—I. Primitive and Antique Art,' by Charles Aitken.

Mr. S. Hole writes :—'In the December "Naturalist" in my account of the migration of the Swift, etc., the direction of the flight of the swallow on the 20th of August is given as *West*. This should have been *East*.'

A thorough investigation of the Pre-historic and Roman remains of Wales is to be undertaken under the direction of the School of Archæology of the University of Liverpool. The work will be carried out under the direction of Professors Bosanquet, Garstang, Myres, Newberry, and Haverfield.

Amongst many valuable papers in the Proceedings of the Academy of Natural Sciences of Philadelphia (Vol. 59 pt. 2) recently received, are, 'New and little known Whelks from Northern Japan and the Kuril Islands,' by Dr. A. H. Pilsbry ; 'The Embryology of Fulgur, a story of the influence of Yolk on Development' by Dr. E. G. Conklin, and 'Notes on the Leaf hairs of Lesquerella,' by E. G. Vanatta. There are several plates.

A contemporary recently records a perhaps not very uncommon bird, a 'little stink'!

'—— Virus is absolutely harmless to human beings and animals, but is speedily fatal to rats and mice.'—(From an advertisement).

In 'Man,' for January, Dr. W. L. H. Duckworth has an illustrated 'Report on a Human Cranium from a stone cist in the Isle of Man.' The skull is now in the University Museum.

A writer in a certain paper 'knew an old horse who used to eat eggs which a hen laid in his manger,' and he asks 'How did he train the hen to come and lay there?' There's a question for our country-side cousins!

We learn on fairly good authority that 'Nature is gradually causing the starling, now fairly started in its career as a marsh bird in hard weather, instead of a digger among hedge-roots, like the stouter-billed thrushes, to become more and more like a snipe!'

In a contemporary, a writer has an article on 'Traces of Pre-historic Man in Yorkshire.' It is mainly occupied by quotations from well-known sources, dealing with the formation of caves and with Palæolithic Man. There are a few sentences bearing upon the title of the paper. In his first paragraph we find the questions: 'What am I?' 'Where am I?' 'What can I know?' We might answer these for the author, but perhaps we had better not!

It is not always a simple matter to define precisely what an *insect* is. The following paragraph headed 'How Insects Grow,' taken from 'Our Home,' seems to definitely settle the point:—'The power of reproduction in insects is one of the most wonderful parts of their economy. On beheading a slug, a new head, with all its complex appurtenances, will grow again; so with the foot of the salamander and claws of lobsters. The end of a worm split produces two perfect heads, and if cut into three pieces the middle reproduces a perfect head and tail. Reproduction is also evidenced in the growth of trees from slips and cuttings, of polypæ and worms from small fragments, and of the renewal of the claws of crabs and lobsters with all their nerves and parts in perfection. So also in the skin, hair, and nails of men.'

The Scunthorpe pigmies are again on the warpath! In an article on Pigmies in Britain,' appearing in a 'Weekly Whirlpool,' we learn that the fact that the so-called pigmy flint implements 'are complete implements is established beyond a doubt; but that they point to the existence of a pigmy race . . . is not proven. Granting, however, that a pigmy race fashioned these implements, there arises the fascinating question as to whether these English, Belgian, French and Indian colonies were branches of one race, or, owing to a migration, identical. . . With the extraordinary vision conjured up by a possible migration of pigmies from India's coral strand to the chalk cliffs of Albion in the dark days of the Stone Age, we must leave the subject.' But why not have more 'extraordinary visions?' On a rock on Cape Horn, a few inches above the water line, there are a few small scratches which have not yet been satisfactorily accounted for. May not these have been made by the early stone age warriors as they passed Cape Horn in their fleet, possibly recording that they were getting short of provisions? On the gold coast, recently, a mysterious box was found, which some Philistine said was a cigar-box. May not this have been the coffin of a pigmy chief who died at sea? It certainly had a label 'best pigmies' upon it. And in digging for rabbits at Scunthorpe the other day, some small frail bones were found. May not these have been pigmies? Far more likely than that they were rabbits! All these circumstances, each perhaps insignificant in itself, when weighed together, surely prove conclusively that a race of pigmies once lived in England. It can be truly said that 'Science is a wonderful invention!'

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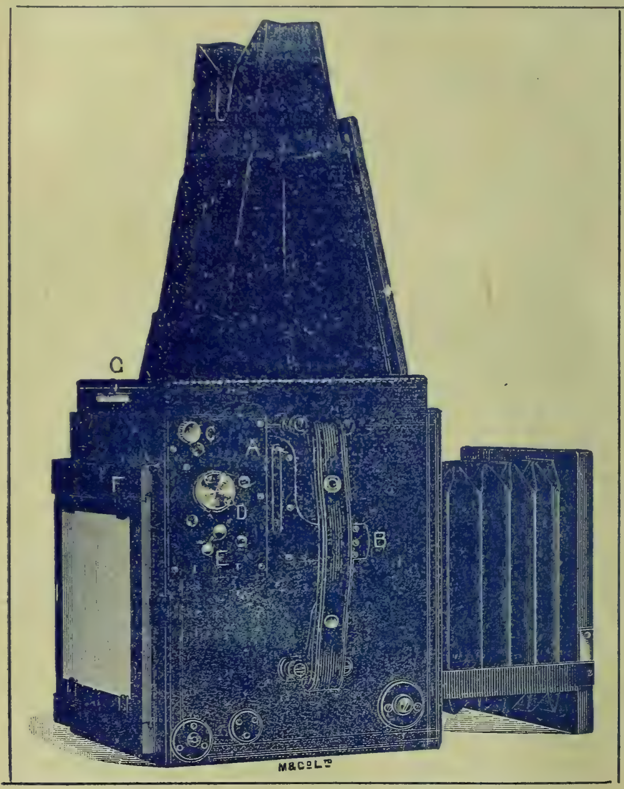

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NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY
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BRITISH MUSEUM NATURAL HISTORY

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NOTES AND COMMENTS.

MANX BEETLES.

At the recent annual meeting of the Lancashire and Cheshire Entomological Society, Dr. J. H. Bailey gave an address on the Coleoptera of the Isle of Man. He described the climate and topography of the island, and shewed the influence of the ocean currents and prevailing winds upon the flora and fauna. The geological structure of the island was also considered, so far as it related to the beetles and their distribution in this interesting area. He referred to the probable date when there was a land connection between the coast of Ireland on the west, and that of Lancashire on the east, as evidenced by the numbers of various classes of Coleoptera and plants, belonging to different periods of migration. Lengthy comparisons were made in this connection, between the numbers and species of the different migrations now existing on the adjacent coasts, as well as in the case of the Alpine forms found on the Manx mountains, and in the highlands of Scotland and Ireland.

SIR JOHN EVANS.

Sir John Evans, K.C.B., forms the subject of an interesting memoir under the 'Eminent Living Geologists' series in the January 'Geological Magazine,' and with it there is also an excellent portrait. From the good work which Sir John has accomplished during his long lifetime in reference to the antiquities of this country, particularly the earlier antiquities, he has received a world-wide reputation. At the present time, in his seventy-eighth year, he is still as enthusiastic in collecting specimens or information as ever he was, as those who are in correspondence with him or meet him at the various societies can testify. Sir John has been the president of the British Association, of the Geological Society, and of many other of our leading scientific institutions at home and abroad, and few savants hold as many honours and degrees at the present time as does he. A list of his works appears at the end of the article referred to, but perhaps the most important of these are his substantial volumes dealing respectively with the Stone Implements, Bronze Implements, and Coins of the ancient Britons. We share the hope of every geologist and antiquary that Sir John may long be spared to carry out his very valuable researches.

THE MARTEN IN BRITAIN.

In the Janaury 'Zoologist,' Mr. H. E. Forrest gives a resumé of the evidences of the past and present status of the marten in England and Wales. Is some of the counties it seems to have been recorded much more frequently than in others. As has already been stated in these pages, the species still lingers in the Lake District, though it is there exceedingly scarce, and unless prompt measures are taken to protect it, it will soon become extinct in Britain. With the following concluding remarks we heartily agree :—'Of our native mammals, none excel the marten in grace of movement and beauty of form. Can nothing be done to prevent its extermination ? If any action be taken, it should be speedily. To preserve it throughout the country would be impracticable, but I suggest that some large land-owner in Wales or the Lake District should make his estate a sanctuary for the animal, and let his keepers strictly preserve it.' It would be an excellent thing if the National Trust, which now has under its charge the Gowbarrow estate, would encourage this interesting mammal, and in this way preserve it for the benefit of naturalists in the future.

THE PRE-GLACIAL FLORA OF BRITAIN.

A valuable contribution to our knowledge of pre-glacial plants appears in a recent number of the 'Journal of the Linnæan Society' (Vol. 38, pp. 206-227), by Mr. Clement Reid and Miss E. M. Reid. Mr. Reid's work in this direction is well known, and the present paper shows how rapid recent advances have been. In 1870 fewer than twenty species were known, in 1890 the number was raised to fifty-six, in 1899 to seventy-eight, while the list now published includes 147 species. These are illustrated by 181 excellent photographs on five plates accompanying the paper. One of the greatest obstacles to progress in this work was the absence of collections of ripe seeds and fruits of British plants, a point worthy of the attention of botanists. As Mr. Reid states, these are the parts most commonly preserved, and he finds that 'almost every species which can be distinguished by other characters can be distinguished by the seed alone . . . and often give better specific characters than the whole of the rest of the plant,' hence the importance of a study of fruit and seed characters for work of this kind.

NATURE OF DEPOSITS.

The pre-glacial flora referred to is found in a series of alluvial and estuarine deposits which underlie the boulder-clay, and stretch for nearly fifty miles along the Norfolk and Suffolk coasts, from Sherringham to Pakefield. The deposits consist of estuarine muds and gravels, apparently brought down by the Rhine, which at that period, after receiving numerous large tributaries—now separate rivers—seems to have flowed across the present bed of the North Sea. The plants of our pre-glacial deposits have been collected almost exclusively from the alluvium of small tributary channels, not from the alluvium of the main river. The great majority of the species found are the same as those still living, but some exotic species occur, the non-British forms here recorded are *Ranunculus nemorosus*, two other species of *Ranunculus*, one or perhaps two water-lilies, *Hypecoum procumbens*, *Trapa natans*, two species of *Viburnum* ?, two labiates, a second species of alder, *Picea excelsa* and *Najus minor*.

These give a decidedly peculiar appearance to the flora, and suggest climatic conditions almost identical with those now existing, though slightly warmer. The present list shows the southern element to be more marked than was previously known, and includes in all probability several extinct species. This brings it more into line with the pre-glacial mammals and mollusca, both of which groups contain various extinct forms.

METHODS OF PREPARATION.

Many of the seeds are impregnated with pyrites, which tends to decompose and to destroy the specimens. To prevent this, the seeds, after removal from the matrix by washing, are placed, while still wet, on a glass slip, which has been covered by a thin film of paraffin wax. The slip is immediately warmed from below, just sufficient to melt the wax. As the moisture evaporates from the upper part of the specimen, the wax is absorbed from the lower, and the whole seed is impregnated with wax, and rendered tough, and can be easily handled. The superfluous wax may be removed by warm filter paper, or after cooling, the surfaces brushed with benzine.

PILLOW-LAVA AND SLAG.

In the discussion on a paper on 'The Origin of the Pillow-Lava near Port Isaac in Cornwall,' by Messrs. C. Reid and Henry Dewey, at the Geological Society recently, Mr. G. Barrow drew attention to the similarity in mode of arrangement of the vesicles in these pillow-lavas and those in the broken-open slag-blocks of which the great Tees Breakwater was built. These blocks were obtained from the blast-furnaces, the slag running into small box-shaped iron trucks. In ordinary practice these trucks were emptied so soon as they were filled, and while the bulk of the slag was still molten ; but when wanted for the break-water some had to stand for several hours, until a sufficient number of truckfuls had been obtained to make up a train, which was then taken by an engine to the end of the breakwater. In this way, the whole of the slag in some of the trucks became completely solidified. When broken open they proved to be vesicular throughout, the vesicles being arranged roughly parallel to the outer walls of the block, just as the vesicles were parallel to the outer wall of the pillows in the lavas ; and, further, the central part of the slag-blocks was the most coarsely vesicular—in fact, almost hollow. When broken up by the sea, fragments of this slag floated away, some even to the shores of Holland.

YORKSHIRE GEOLOGY.

THE 'Proceedings of the Yorkshire Geological Society,' xvi (2), 1907 [correctly January 1908], is, with the exception of Messrs. Sheppard and Stather's paper on the Glacial Drift of Holderness, severely Carboniferous in tone. Perhaps the most generally interesting of this series of interesting papers is Hind's note on the dendroid Graptolites from the Pendleside Series. The screen-process reproductions of excellent photographs which illustrate the various papers leave little to be desired.* We wish the Council of the Society which issues this valuable publication would order the date of publication to be printed on the cover of the separate parts, for it seems extremely unlikely that the date 1907 is a correct one for this part. This is an old grievance, and most unfair to authors, especially to one like Dr. Hind, the priority of whose new specific names may at any time be called in question. The proper method of dating serial publications can be seen on the covers of the Quarterly Journal of the Geological Society, or the Proceedings of the Geological Association (London), and there is no editorial difficulty whatever attending such a course.

THE PALÆONTOGRAPHICAL SOCIETY.

The Palæontographical Society's Volume for 1907 was issued on the 30th December, 1907, and contains the follow-

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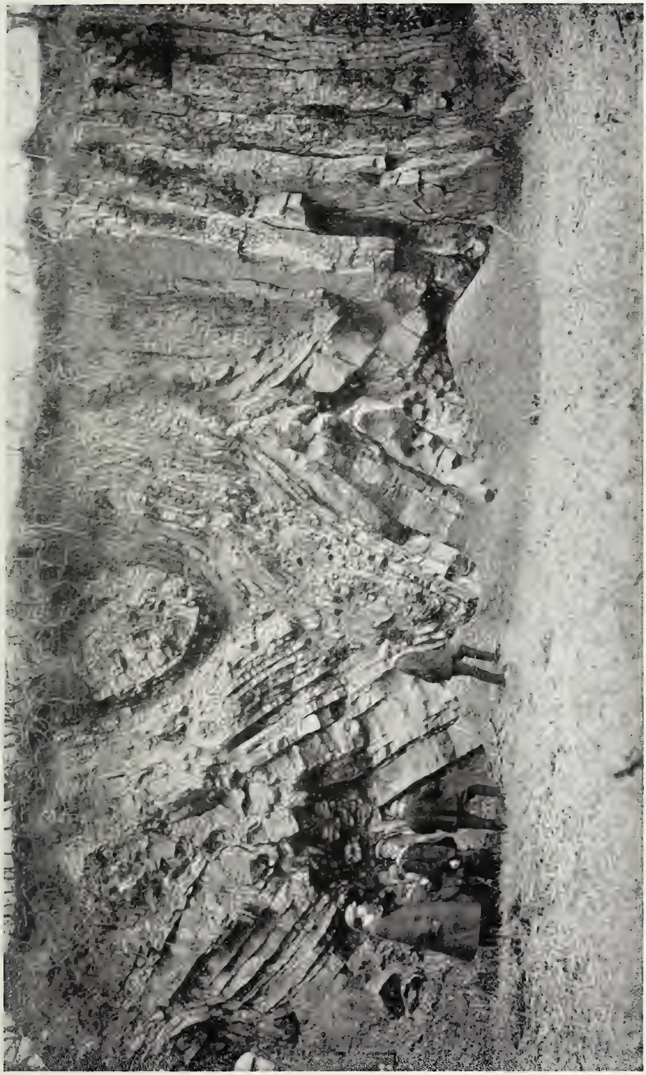
* One of these we are kindly permitted to reproduce (plate x.).



Section in Carboniferous Limestone, Foxley Bank.

BRITISH MUSEUM NATURAL HISTORY

ing parts:—W. K. Spencer's fourth part of the 'Cretaceous Echinodermata' (Asteroidea and Ophiuroidea), a part containing a key-table to the marginal plates of Asteroidea, which should prove of great value to zonal workers; as the numerous and common ossicles found in the Chalk can now be identified with ease and certainty; R. H. Traquair's third part of the 'Carboniferous Ganoids'; Smith Woodward's third part of the 'English Chalk Fishes'; Henry Wood's continuation of the 'Cretaceous Lamellibranchiata'; part six of the 'British Graptolites,' by the Misses Elles and Wood; Philip Lake's second part of 'British Cambrian Trilobites'; and title-pages, indices, and prefaces, to Buckman's 'Inferior Oolite Ammonites,' Blake's 'Fauna of the Cornbrash,' Whidborne's 'Devonian Fauna,' and Miall's 'Sirenoid Ganoids.'

THE CHALK OF THE ISLE OF WIGHT.

Volume xx, part 4 of the 'Proceedings of the Geologists' Association' (London) is entirely devoted to Dr. Rowe and Mr. Sherborn's Report on the White Chalk of the Isle of Wight. As usual, the work is divided in that Dr. Rowe writes the text, and Mr. Sherborn provides the maps and sundry notes. The paper is illustrated by sixteen collotype plates of scenery, taken by Dr. H. E. Armstrong, many having explanatory key-plates, and by a series of maps on the scale of six inches to the mile for all but the central mass of the island, which is mapped on the two-inch scale. The paper provides the usual wealth of detail, and we can only suppose it will be found as correct and useful as the earlier papers of this series have proved to be. With this fifth Report, which concludes the coast series (Norfolk being in the excellent hands of Mr. Brydone), Mr. Sherborn provides an index to the whole series, from which it is possible to trace the history of a species, or a zone, or any matter for which one is looking. We offer our congratulations to the authors and to the Geologists' Association, which has every reason to be proud that these papers have been issued in their pages.

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In volume 15, part 27, the **Publications of the Thoresby Society** recently issued, are 'Notes on Cressets,' by Dr. J. H. Whitham; a local find of over 7,000 Roman coins; this occurred at Stanley, near Wakefield, in October, 1905, and many of the coins are figured by the author, Aquila Dodgson; and 'Discovery of Ancient Foundations and Human remains at Temple Newsam,' by W. Braithwaite. There are also other papers of interest.

THE ADVANCEMENT OF GEOGRAPHICAL SCIENCE BY LOCAL SCIENTIFIC SOCIETIES.*

H. J. MACKINDER, M.A.

THE honour of presiding over your Conference has been conferred upon me in order, as I understand, that I may have the opportunity of bringing before you the desirability of local geographical research in this country. From the fact that I live in London, I cannot pretend to offer any experience or useful advice either in the matter of the opportunities open to the Societies which you represent, or in regard to the difficulties which may beset them. How far what I am going to say may be practical under your conditions is for you to decide. My function, it appears to me, is to place before you an ideal, and to speak to you simply as a geographer. This much, however, I am entitled to say—that the work which I wish to commend to your attention has been accomplished in neighbouring countries, in some degree at any rate, by the co-operation of local agencies.

In France there are some twenty local Geographical Societies, there being one, with very few exceptions, in each of the old provincial centres. These Societies hold an annual conference which resembles this Conference except that it is for geography only. Not a few geographical studies relating to different parts of France have emanated from these Societies, and have been published in the 'Annales de Géographie' and other journals. It is in part from these fragments that Vidal de la Blache has built up his admirable description of France in the introductory volume of the great history which is now being issued by Lavisse.

In Germany the same end is attained, although with slightly different machinery. There, as you know, university education is more markedly decentralised than in France, or even in Britain, with the result that scattered over the whole country there are geographical institutes of university rank whose professors and students have put together a rich geographical literature descriptive of every part of the land.

My suggestion is that in this country a similar work might be achieved by the co-operation of your Societies. It is true that we have a certain number of provincial Geographical Societies, but, with the exception of the Royal Scottish Geographical Society in Edinburgh, they are situated in the great commercial centres, and devote themselves rather to the spreading of a knowledge of the lands beyond the seas than to the study of local British geography. Here again I must take a partial exception in the case of the Royal Scottish Geographical Society at Edinburgh ; but I think that I have not misrepresented the very valuable aims and work of the Societies at Southampton, Manchester, Liverpool, and Newcastle, or of the branches of the Scottish Society at Glasgow, Aberdeen, and Dundee. In course of time the geographical teachers in our old and new universities may no doubt come to our aid, but there are wide areas of our country which have no university, or none sufficiently developed as at present to afford a Chair in Geography. For some time to come I see no agencies which can cover the United Kingdom consistently with centres of geographical study unless they are to be found in the Societies which you represent.

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* Address delivered before the Conference of Delegates at the Leicester meeting of the British Association; printed here by permission of the Council of the Association.

Let me now give a first indication of the nature of the work which I am proposing. Many of your societies have members interested in botany, and in your publications there are not a few valuable memoirs dealing with the distribution of plant species. That, of course, was a very necessary study, but we are now developing a different study, whose object is to ascertain the distribution of what are known as plant associations. For instance, in the twenty-first and twenty-second volumes of the 'Geographical Journal' you will find maps showing the distribution of the plant associations of Yorkshire, which have been compiled from the researches of Dr. William G. Smith and others who have assisted him. Here you will see carefully mapped by Bartholomew the distribution of the various moorland, woodland, and farmland associations. For instance, under the head of moorlands you will find distinguished upon the map the bilberry summits, the cotton-grass bogs, the heather moors, the grass heaths, the natural pastures, and the lowland wamps. In each of these associations there are several characteristic plants, which occur together and very rarely apart —a fact which is obvious to anyone who contrasts the trees and undergrowth which constitute an oak wood with those which constitute a beech wood. Primarily, of course, the distribution of these associations is due to differences of climate and soil, but also it must be remembered that the dominant plants themselves form the required environment of the minor species associated with them. I commend to you the study of these maps themselves, for they will give you a far better idea of the nature and value of this kind of botanical geography than any mere description of mine. Admirable examples of the same kind of work are the memoirs and maps of the late Robert Smith, published in the sixteenth volume of the 'Scottish Geographical Magazine' under the title of 'A Botanical Survey of Scotland.' Results of this nature, I may point out, are, however, comparatively useless unless the different parts of the country are mapped according to a more or less uniform scheme; hence the value of the lead which such a conference as this may give to local societies.

The distribution, however, of plant associations is of comparatively little value when studied alone. We require for its interpretation a knowledge of the local land forms and drainage systems, of local drift geology, of local climate, and many other local data which can be expressed upon maps. The geographical method of research is to construct with scrupulous care separate maps of each of these orders of phenomena, and then to compare them, when correlations of distribution will leap to notice, and will suggest fresh inquiries. It is obvious that for the study of the causes of local distribution we must often go to historical records, whether embodied in documents, in place names, or in archæological relics. My suggestion is that the distribution of all these things should be systematically studied upon the map. It is true, no doubt, that maps are attached to many special studies, botanical, geological, or archæological; but the research which I am suggesting treats the comparison of a large number of such maps as its main material, and is not satisfied with having them as incidental illustrations in books of non-geographical aim, and with having them prepared according to different methods, and therefore without facilities for comparison. In other words, the object is to have a complete analysis of each district from a geographical standpoint.

We already have examples of the kind of work which I am indicating, although, as being product in each case of one man's research only, they have not and cannot have the thoroughness and richness which would ensue from the combined and prolonged endeavour of one of your societies. Dr. H. R. Mill has described a small part of Sussex in his 'Fragment of the Geography of England,' which you will find in the fifteenth volume of the 'Geographical Journal.' Dr. Herbertson, again, has a description of the Oxford Sheet of the One-inch Ordnance Survey Map in the first volume of the 'Geographical Teacher,' and Professor Geddes has given us descriptions of the neighbourhood of Edinburgh in connection with his Outlook Tower. But these essays, though excellent so far as they go, are hardly comparable to the elaborate Continental descriptions to which I have referred. No really adequate geographical account of the British Isles will be possible until we have a much richer local literature from which an author may mine. Yet such an account is essential to any scientific basis for British national history.

What is wanted is that in connection with each society it should be the duty of some member to correlate the results obtained by the different specialist sections. This member would extract from the work of the botanists, the archæologists, the geologists, and others the data for the construction of his scheme of maps, and it would fall naturally to him to suggest the formation of new sections, and to enlist the enthusiasm of fresh students for the purpose of filling lacunæ in the local researches. In other words, it would be his special function to correlate from a geographical point of view the work of the various specialists, and to draw deductions from his correlations for the guidance of the specialists in their further work. Local investigation, instead of being haphazard and isolated, would thus become co-operative, and the results would be synthetic. Side-lights would be thrown on all manner of special studies, and the students of other sciences would thus get back with interest the contributions which they made to geography.

All this is easily said, but our experience shows that only a geographer of adequate training and insight could perform the function which we here demand. Such persons are no doubt increasing in number. The University Schools of Geography at Oxford and elsewhere are gradually supplying them, and before long it should be possible for each of your societies to find some one, say a master in some neighbouring public school, who is capable for the purpose. In some cases you may even have a member who would be willing to undergo the necessary training specially for your service.

I am aware, of course, that your societies are perhaps more often than not on a county basis, and many of our counties do not coincide with natural geographical units or groups of units. You have the same thing in France, where the natural 'pays,' such as Caux, Bray, Bresse, Bauce, Sologne, and so forth, bear distinctive names more frequently perhaps than in this country. Economy of effort should, in the case of certain counties at any rate, prompt an exchange of territory with adjoining counties. In Hampshire, for instance, the little strip of the Weald along the eastern border of the county could not be understood apart from the much larger Wealden areas of Surrey and Sussex, and the study of it might therefore very reasonably be separated from the great chalk plateau of Hampshire and Wiltshire. In other words, your societies might divide the land into countries analogous to the 'countries' hunted by the various packs of hounds, the Quorn, the Craven, and the rest of them.

Finally, I would suggest that any local Society which saw its way to organising and carrying through such a thorough and comprehensive survey as to lead to a geographical synthesis of all the aspects, physical and humane, of local knowledge would blend itself with the local life and establish itself securely among the local institutions. On all hands it is now agreed that education in such subjects as geography and history should be based on the study of the home district. What finer work for the efforts of a local Society than to produce a text-book for the local schools which shall rouse and satisfy interest in the surrounding countryside, and in the local monuments, generate local patriotism, and establish an outlook into the larger world on a concrete foundation rather than on the sands of mere learning? Such a text-book might also be correlated with the local museum arranged for visual instruction, and so classified as to prompt systematic thought. Of course I am not here advocating the incorporation into such an educational system of the occasional special collections, which have more than a local value and are visited by scholars from a distance.

The outcome of it all seems to me to be this: that while we can advance knowledge only by being specialists, yet we do require that in each important Society there should be one or more whose speciality consists in the correlation for the locality of all the other specialities; and, in my opinion, this correlation can best be accomplished on a geographical basis and by geographical methods.

OAKS AND THE CATERPILLAR PLAGUE.

G. W. MASON,
Barton-on-Humber.

I WAS much interested in the article entitled 'Sylvan Vegetation of Fylingdales, N.E. Yorks,' by Mr. J. W. Barry ('Nat.' 1907, p. 423-31), more particularly that section upon the 'Oaks and the Caterpillar Plague.' Mr. Barry refers to the immense destruction to the leafage of the oak trees caused by the ravages of the Caterpillar of the Oak Leaf Roller Moth (*Tortrix viridana*), and writes that 'when the caterpillars are at their height, there is a sound throughout the woods as of a light but continuous shower of rain. This is, of course, from the fall of the excrement.' I have frequently visited the large Pelham's Pillar woods, near Caistor, in Lincolnshire, where the oaks are stripped of their leaves in the manner described by Mr. Barry, and I have often heard early in June a light, pattering sound. I ventured to suggest to Mr. Barry, that the real cause of the sound of the 'light shower of rain' was the working of countless jaws of hungry larvæ, not only of *Tortrix viridana*, but of several of the genus *Hybernia*, together with numerous other larvæ. It is well known amongst Lepidopterists that June is one of the great months in the year for tree feeding larvæ. I cannot help thinking that the excrement is too small to make an appreciable noise; and besides, the bulk of the larvæ of *T. viridana* are feeding within spun-up leaves, and most of their excrement remains near them entangled in their silky webs on the leaves. As a breeder of Lepidoptera, I know from experience what a noise can be made by a brood of larvæ feeding in a small room. It reminds me, too, of a passage in Figuier's 'Insect World.' The author is dealing with the rearing of silkworms, and speaking of the full-fed larvæ, he says: 'the produce of thirty grammes of eggs, consume in weight as much as four horses, and the noise which their little jaws make resembles that of a very heavy shower of rain.' Of course, the silkworm full grown is a large caterpillar; but I am inclined to think that the larvæ of the several species of Winter Moths have a good deal to do with the noise. Mr. Barry, in writing to me, says that the sound certainly comes from the branches of the trees, and he should not have thought that there were any other larvæ on them in relatively appreciable numbers.

He suggested that I should send a note to the 'Naturalist.' It would be interesting to have the opinions of other Entomologists on the subject.

Mr. Barry is quite right in stating that the sound alluded to is caused by the fall of the excrement (or frass as it is termed by lepidopterists), and the fact is well known, I suppose, to most field lepidopterists. But it is not all caused by the larvæ of *Tortrix viridana,* for although that species ordinarily far outnumbers probably any other, there are many other species with it, and those of *Cheimatobia brumata, Hybernia defoliaria* and other *Hybernidæ* are in some seasons in immense numbers. I have seen the oaks, and in a lesser degree the birches, completely defoliated by the larvæ of *Hybernia defoliaria* and *H. aurantiaria.* These larvæ, too, are very much larger than those of the Tortrix, and consequently the noise made by the dropping of the frass will be greater. If when next Mr. Mason is in the woods, and hears this sound, he will spread a newspaper, or sit under a badly-infested oak for a few minutes, he will be quite convinced as to the source of the sound. Moreover, these larvæ eat comparatively little in the daytime, the great bulk of the feeding being done during the night.

G. T. P.

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In part 76 of the **Yorkshire Archæological Journal** are, amongst other items, notes 'On a Sculptured Representation of Hell Cauldron, recently found at York' by J. Bilson, F.S.A.; 'Evidence of the Religious Beliefs of the Ancient Britons' by J. R. Mortimer, and 'Notes on a British Chariot Burial at Hunmanby, by T. Sheppard.

We have received a volume entitled **Barrow Naturalists' Field Club and Literary and Scientifc Association.** Annual Reports, Proceedings, etc., for 29th and 30th years ended March, 1906. Vol. 18, published 1907. The volume contains 168 pages, and though appearing perhaps a little late in the day, it is a very useful production, and reflects every credit upon the editor, Mr. Harper Gaythorpe. There is a useful summary of the work accomplished by the Club during the two years, in addition to a summary of the various papers read before its meetings. We are glad to notice that the editor has given particular prominence to papers of local interest, though there are also summaries of papers on such subjects as 'Irish Humour and Humourists,' 'The Sunny South,' 'Ancient Rome,' 'To the Arctic Regions and back in a fortnight,' etc., possibly out of respect to those who had delivered the lectures. Such items, however, would be much better omitted from publications of this nature, and we feel sure our Barrow friends would be able to spend the money they have cost, on notes having a bearing on their own district. Of particular value are the papers dealing with 'Waste of Coast Line, Furness and Walney in 1,000 years' by W. B. Kendall; 'Recent Work amongst the Birds,' by Dr. Daniel; 'Furness Abbey in the days of the Monastery,' by H. G. Pearson, and 'The Crankes of Urswick,' and 'Swarthmoor Friends' Meeting House,' by the editor. The volume is illustrated.

THE CHEMISTRY OF SOME COMMON PLANTS.

P. Q. KEEGAN, LL.D.,
Patterdale, Westmorland.

DOG'S MERCURY (*Mercurialis perennis*).—It is delightful in early spring to see the mother earth of coppice woods and shady hedgerows studded with the brilliant greenery of this highly social and uniform plant. It affects a lime soil rather, and is more abundant there, but it is very common on clays. It belongs to a large order which is distinguished by the presence of a very poisonous latex indicative of extensive decomposition setting in among the products of deassimilation. On May 28th the leaves contained 1.4 per cent. of matters extractable by boiling benzine including much carotin, with a little wax and resin. The aqueous solution of the alcoholic extract was deep blue and cloudy, and had no tannin ; on adding HCl it turned red, and a resinous precipitate was deposited which, with sulphuric acid, gave a brown or yellow colour. There was also another resin which dissolved in the same acid with a brown-violet colour. The aqueous extract of the leaves was green, but on evaporation it becomes deep red, and gives a dirty green precipitate with acetate of lead. There was very little sugar, mucilage or starch, but much whitish flocculent matter (pararabin), and small crystals of oxalate of calcium. The ash of the overground parts of the plant amounted to 11.5 per cent. in dry, and contained 44.5 per cent. soluble salts, 4 silica, 21.4 lime, 4.8 magnesia, $4P^2O^5$, 6.9 chlorine, and 5.6 SO^3. The plant contains choline, and hence on distilling with water, the fishy-smelling gas trimethylamine passes over with the vapour. The peculiar blue pigment which is developed during drying is called bizetta, and was shown by Lehmann and Molisch to be not related to indigo. It is reddened by acids, but the blue colour is not restored by alkalis, and is colourless in the juice, and only turns blue by the action of a ferment on exposure to the air during the general drying up and dying of the protoplasm. The poisonous principle, which is fatal to sheep, is an oil which seems nearly allied to the well-known irritant and acrid croton oil.

Ribwort (*Plantago lanceolata*).—This extremely common, perennial plant is familiar by reason of the anatomical structure of its flower stock (scape), which is surrounded by a ring of stout fibres projecting into five strong ribs, and enclosing a very thin-walled large-celled 'pith,' the whole so brittle that the head (spike) of the 'sodger' is easily lopped off by children. There are mycorhizæ attached to the roots. On 25th June, the dried leaves contained 1.8 per cent. of wax and carotin, but no fat or resin; the alcoholic extract is acid and bitter, and has a considerable quantity of an iron-greening tannin which does not precipitate gelatin, and yields quinic acid on oxidation. There is also a bitter principle or resinous glucoside which is decomposed by the action of mineral acids into a purplish black substance and some sugar; there is not much soluble mucilage or proteid, no starch or pararabin, and only a little oxalate of calcium. The crude fibre amounted to 38.8 per cent., and the ash to 8.3 per cent., which had 7.9 per cent. P^2O^5. The ash of the overground parts of the plant contained 39.5 per cent. soluble salts, 5.2 silica, 17.3 lime, 5.6 P^2O^5, 6.2 SO^3, and 7.8 chlorine. There were no soluble carbonates. A ferment identical in properties with the rennet of animals has been detected in the leaves. The seed with shell encloses much fat and crude fibre, and is also very mucilaginous. The foregoing analysis recalls that of certain members of the order Scrophulariaceæ, those especially of slow growth, which inhabit poor soil, have no nitrates in the leaves, have a feeble transpiration, and are enormously prolific.

Red Dead Nettle (*Lamium purpureum*)—.This annual plant is conspicuous in waste, and cultivated ground, etc, where its grovelling, decumbent habit renders analysis in some respects unsatisfactory. The chemistry, however, is very interesting, if only by way of contrast to that of other Labiates. On June 1st, the overground parts contained 3 per cent. fatty matter, with some wax, and a moderate amount of carotin. The alcoholic extract was acid, and of a strong red tinge, and had a tannoid or tannin which was iron-greening and precipitated bromine-water, but not gelatine, and was evidently a derivative of hydroquinone; also a resin dissolving in sulphuric acid with brown colour, and a bitter principle dissolving in the same reagent with a reddish yellow colour. There was a considerable amount of pectosic mucilage, some sugar, no reserve starch, a substance (probably a ferment) which yielded strong proteid reactions, and a large quantity of oxalate of calcium. The ash contained 36 per cent. soluble salts, 18 silica, 15.8 lime, 6.7 P^2O^5, 2.7 SO^3, and 2.3 chlorine, presumably here, however, the silica is too high (some of it being merely earthy matter clinging to the outer tissues of the roots and stem), and therefore the other constituents are represented as too low. At all events, the great amount of carbonates in the ash indicated a powerful acidity of the cell sap. The warmth and richness of the colouration, which sometimes suffuses the whole plant, demonstrates that the process of deassimilation is pushed in this case far beyond the volatile oil stage of the Mints and other of its congeners. The odour of its bruised parts does not arise from a volatile oil, but rather from a decomposed glucoside. The growing plant is only moderately starch-producing, but rich in sugar, and organic acids, *i.e.* it is succulent, and grows with only moderate quickness.

Great Valerian (*Valeriana officinalis*)—This extremely graceful umbelliferous-looking plant crowned with a splendid corymbose inflorescence of an exquisite fleshy tint must needs command the attentive interest of every lover of natural beauty. The rhizome is very short and thick, and throws out a multitude of long branched adventitious roots in all directions, and its sub-epidermal layer bears a number of long cells with corked walls enclosing volatile oil ; the parenchyma has some tannin, and small starch granules. The fresh root on distillation with water, yields 0.5 to 1 per cent. volatile oil, composed of a terpene, a camphene, borneol $C^{10}H^{18}O$ with its oxide and formate, acetate and valerate esters, also a little free valeric acid is developed with age. The root contains also 6 per cent. resin, a reducing sugar, valeric and malic acids with their salts, a strong oxydase ferment, and the ash has much manganese. Medicinally, it reduces the reflex and other excitability of the nervous system, but in large doses it is a general and digestive stimulant. On the 10th August, the whole leaves contained 3 per cent. carotin and wax, with a little resin, also a tannoid, and much caffeatannin, a bitter principle dissolving red brown in sulphuric acid, some sugar and proteid, much pectosic mucilage, no free phloroglucin, and but little starch or oxalate of calcium. The ash contained 16.2 per cent. soluble salts, 4 silica, 37.5 lime, 7.8 magnesia, 5.7 P^2O^5, 3 SO^3, and 4.3 chlorine, there were very much insoluble carbonates. The analysis altogether is very interesting, and recalls that of the Umbelliferæ rather than that of the Compositæ or the Rubiaceæ. There are the three special features thereabout which merit special attention. Firstly, the quantity of carotin in the leaves is exceptionally large, and it is the cause of the remarkably rich dark green colouration of those organs. Then again, the proportion of lime in the ash is probably unparalleled in that of our native wild plants not decidedly calcicolous, and this, notwithstanding that it flourishes and propagates quite freely and profusely in wet or dry soils, very poor in lime. Thirdly, although the stem and leaves abound in mucilage, the deposits of oxalate of calcium therein are very slight, a circumstance which indicates that in the process of deassimilation, it is malic or valeric acid rather than oxalic acid which is the compound detached from the albumenoid molecule, and subsequently neutralized by the very large dose of lime sucked up and absorbed by the powerfully developed hydrophilous root system.

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Illustrated Index of British Freshwater Shells, by **A. G. Stubbs.** Taylor Bros., Leeds, 1907. Price 3/6.

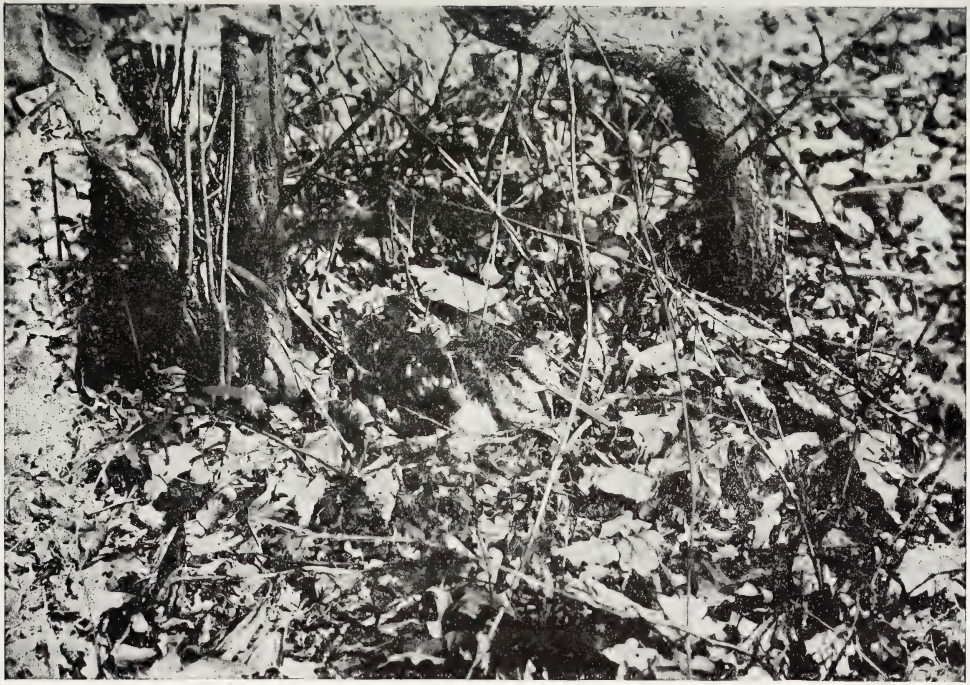
On three plates, excellently produced, well mounted on stiff cards, and bound in a strong cloth cover, are represented the whole of the British species of fresh-water shells. With each plate is a 'description' so arranged and folded that each plate, with its description, can be seen at one time. In addition to the illustrations of typical forms, full details are given of the chief characteristics of sub-species, as well as particulars of their relative scarcity or abundance. A valuable feature is the enumeration and description of the varieties. This 'Index' will be a great help to the collector.

Woodlanders and Field Folk, by **John Watson** and **Blanche Winder.** London: T. Fisher Unwin. 302 pp., 5/-

In this well-produced volume almost every branch of popular natural history is touched upon, and illustrated by a profusion of plates, which make it a very desirable book for a young naturalist. The illustrations vary in quality, some are obviously from 'planted' birds, etc. The one we are kindly permitted to reproduce (plate xi), is an admirable example of protective resemblance, the woodcock being almost invisible. The book deals with perhaps too many subjects, resulting in inaccuracies being rather too frequent. The matter also varies in quality—in some places the language used being very pleasant—elsewhere it is too 'fine' altogether.

Birds of the Lock and Mountain, by **Seton P. Gordon.** Cassell & Co 181 pp., 7/6 net.

In this case the title of the book clearly describes its contents, and Mr. Gordon deals with the Golden Eagle, Grouse, Capercailzie, Ptarmigan, etc., his notes being illustrated by a very fine series of photographs of the birds and their haunts. We notice some of the articles are reprinted from 'The Illustrated Sporting and Dramatic News.' As seems to be the rule with the army of writers on ornithological subjects nowadays, the author dwells upon the hardships and trials of taking photographs. He says the photographing of the eyrie was rather a risky preceeding, for the camera was in constant danger of falling, '*and the branch on which I was standing was old and rotten in the extreme*' This may have been an achievement, but it was not wisdom. The author also often sat up all night, etc. The illustrations, especially of the golden eagle, are very fine indeed. We are glad to learn that in one or two favoured localities the golden eagle is increasing.



Woodcock on Nest.

BRITISH MUSEUM NATURAL HISTORY

THE STUDY OF FUNGI IN YORKSHIRE.

(Being the Presidential Address delivered to the Yorkshire Naturalists' Union at Halifax, Dec. 14th, 1907).

C. CROSSLAND, F.L.S.

It is customary for each retiring President to give an address at the end of his year of office bearing upon some branch of Natural History to which he has given attention. This custom marked out the theme of my discourse on the present occasion; therefore, the only point for me to decide was which branch of the subject would be best to deal with. It occurred to me that 'The History of the Study of Fungi in Yorkshire' would be appropriate, more so, perhaps, because it was a Halifax man—James Bolton—who first wrote and published a British book dealing solely with Fungi.

My address involves no absorbing natural history problem, but consists chiefly of historic details. After a short sketch of the difficulties attending the study of this branch of natural science, the details, including a few notes on the workers, will be given in chronological sequence.

Fungi may be roughly described as cellular cryptogamic plants, devoid of chlorophyll, all either saprophytes or parasites, deriving their nutriment from a dead, or a living organic matrix. The mycelium, or spawn, almost always hid from view, may be considered to be the real plant; while the exterior structures are simply the fructification. The mycelium generally consists of fine thread-like filaments, ramifying in all directions among humus, rotting leaves, in dead wood, etc. It also penetrates the living tissues of both plant and animal. In some species it consists of tough strands of closely agglutinated filaments, like thongs of leather, in others, like sheets of wash-leather, hard knobs, etc.

The organisms which are associated together under the common denomination of Fungi are the most protean and polymorphic in the entire vegetable kingdom, and present great difficulties in the way of generalisation.' *

They are found wherever other vegetable, or animal substances exist. The myriads of their spores, or reproductive elements, ensure their distribution. In this country they are commonest in old, moist woodlands, where decaying stumps,

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* Cooke, 'Introduction to the Study of Fungi,' p. 9.

trunks, and fallen branches abound. Many species select particular environments, and are seldom found under any other conditions. In damp woods micro species are fairly plentiful through the year, but in autumn—the fungus season—it is scarcely possible to pick up a moist decaying leaf or branch that is quite free ; twigs sometimes may have on them half-a-dozen species in as many inches. Many are microscopic in size, others are large ; a specimen of *Polyporus giganteus* cut at Mytholmroyd a few weeks ago, weighed 45 lbs. When fungi were not so well known, it was thought we might have in this country as many fungi as flowering plants, now we know there are *three* times as many. In Britain there are over 5,500 known species, and the number is constantly increasing. In 1836, there were 1385 (Eng. Fl.) ; in 1860, 2380 (Berkeley's 'Outlines of British Fungology') ; in 1871, 2,810 (Cooke's Handbook). In 1905, the date of the publication of the Yorkshire Fungus Flora, there were in this county alone, no fewer than 2,626 known species, and 55 have since been added. The old parish of Halifax, with an area of 129 square miles, has up to the present time yielded over 1,200 species. So long as students take the trouble to search for them, fresh things will be found year after year ; new species will be discovered, and the known distribution of many that are thought rare will be considerably widened. Three new to science have been discovered this year (1907) : two on the Union's excursions, and one a few weeks ago, the latter by James Needham, of Hebden Bridge. In addition to the numbers of British Fungi given above, there are the Bacteria.

The percentage of British botanists who have been attracted to this branch has always been exceedingly low : between 4 and 5 per cent. This is not surprising when we come to consider the difficulties which beset its study compared with that of the higher plants.

Fungi are very inconstant in their appearance : a species may be seen in abundance one season, and perhaps never again at the same place. Their season is of short duration ; the distinguishing characters are very few compared to those of other plants, and it is often difficult to determine specifically closely allied species with any degree of certainty ; fleshy species soon perish, and must be examined the same day as gathered, or the day following ; if dried, many shrivel up and lose their natural characters. Again, they are less attractive than other plants to the superficial observer, and the smaller species require special search. Doubtless further reasons why this group has been so much neglected will suggest themselves. These difficulties were seen by pioneer workers, and perhaps in greater force, when so little was known about fungi. In 1788, Bolton writes :—' Much confusion has long prevailed in this genus of plants, chiefly owing to the brief, or obscure descriptions which have been given of them ; for their parts are so few, that every one ought to be regarded with the greatest care, with all that is singular and peculiar to its circumstances.' Few as the characters were, and are, Bolton suggested more than one hundred points it was possible to observe in one or other of the then known toadstools. He appears to have possessed a marvellous insight into these uninviting plants.

So far as I can learn, the oldest Yorkshire record of a fungus is *Geoglossum difforme*, Hampole Wood, near Hutton Pagnall : Mr. Stonehouse, 1650. (Lee's Fl. W.R., p. 731).

In 1672, Dr. Martin Lister, one of our oldest pioneers in several branches of science, had a paper on ' An odd kind of Mushroom,' in the ' Phil. Trans.' (p. 5116). This he found in plenty in Marton Woods, under Pinno Moor, in Craven, 18th August, 1672. Bolton refers this to *Agaricus piperatus* = *Lactarius piperatus*. In 1675, (' Phil. Trans.', p. 225), Dr. Lister contributes a paper on ' The Flowers and Seed of Mushrooms,' as instanced in *Fungus porosus crassus magnus*, very frequent in August under hedges, and in the middle of the moors in many places in Yorkshire ; he also mentions another which, when cut, changes its colour to deep purple or blue.

In 1693 (' Phil. Trans.', p. 554), Sir Tancred Robinson, a Yorkshireman, refers to '*Tuber terrae*' or earth tuber. Mr. Massee considers the author to be dealing with a fungus, which, from the figure, is undoubtedly what we now call *Tuber æstivum* Vitt., our best edible truffle.

There is an interval of eighty years before we find any further mention of Yorkshire Fungi, and this is in the Catalogue of Halifax Plants, prepared by James Bolton, for Watson's History of Halifax, 1775. It includes 55 species of Fungi.

We next come to Bolton's ' History of Fungusses Growing about Halifax,' the first volume of which was published January 1st, 1788. Volume II. followed the same year. Volume III. December 1789, and Supplement, December 1791. This work was published under the patronage of the Duke of Gainsborough, and was the first British publication exclusively devoted to

Fungi. It is illustrated by 182 plates, upon which are figured 231 species. There were two issues: one coloured, the other plain. About 220 of the 231 are easily identified, and have been accepted and quoted under various names in their works by subsequent European authors, as Persoon, Fries, Rabhenhorst, and others on the Continent, and by Berkeley, Cooke, Stephenson, and Massee in this country. Many were species new to science, and others previously undescribed in Britain. Many of the plates are signed 'James Bolton, Stannary, near Halifax.' He etched all his own plates both in this and in other works dealing with different branches of natural history. He was an 'all round' naturalist, with, at least, forty years experience in the Halifax district—1758-1799. Not only birds and butterflies, flowering plants and ferns, but mosses, hepatics, algæ, lichens, and fungi came within his ken. His son, or brother, Thomas, collected butterflies, moths, beetles, shells, and fossils.

We learn that early on in his natural history observations, he took an interest in this subject. In 1788 he says:—'I have carefully observed, drawn, and described the plants of this order, when in season, for twenty-seven years past, having drawings in my possession which I made in 1761.' He rightly remarked that the Cryptogams were the most entertaining branch of botany, but had up to that time been superficially regarded. Referring more particularly to fungi, he said:—'That our knowledge of . . . [these], the last order of this class, is very deficient will evidently appear from [the fact] that a greater number of its species have been actually gathered in a compass of ground not exceeding eight or ten miles round Halifax, than has yet been ascertained in our best and most correct Catalogues of British Plants.'

We learn incidentally that his investigations were constant. In speaking of the irregular appearance of fungi, he says:—'In September, 1777, the *Helvella mitra* grew in several woods, in hedges, under trees, and even in pastures and meadows, in this neighbourhood, plentifully; since then, in the space of ten years, though my researches have been regularly kept up, I have not met with more than three or four specimens of that plant.' We have had many similar experiences, several of which are narrated in the 'Flora of Halifax.'

A remarkable instance is furnished by one of Bolton's own species—*Coprinus oblectus*. This he figured and described in 1790. One or two later English authors did not accept it, because they had never seen it, nor has it been recorded by anyone until 1892 when it was re-discovered at Halifax. A few were also seen at Hebden Bridge. In that year it appeared at Halifax abundantly, but only sparingly the year following, and gradually disappeared. No trace of it has been seen for several years back, although the localities have been carefully observed in the season.

Bolton describes his specimens with great acuteness, in clear, concise terms, and this, be it remembered, when they were little understood. He was practically confined to superficial characters, having to work with what he calls a little 'spy-glass.' Had he had at command the compound optical appliances at present in use, he could have included microscopic details, but this was then impossible. As it is, some of his descriptions are still thought worth giving in full in recent text-books. Had all subsequent mycologists, who have written descriptions of fungi, been as painstaking, and used to the full the advantages they had over Bolton, afforded them by improved lenses, the present generation of mycological students could often have been more certain of the things they were dealing with.

There are evidences of great care throughout the work. He appears to have kept himself well posted in the drawings and descriptions of kindred workers by obtaining their publications. Those he more particularly refers to are:—Van Sterbeeck, Antwerp, 1654; Mersilius, Amsterdam, 1714.

Vaillant's *Botanicum Parisiense*, Amsterdam, 1727, contains among other excellent figures of plants, about ninety very accurate ones of Fungusses.

Micheli *Nova Plantarum Genera*, Florence, 1729, enumerates about eight hundred species, and gives a great number of excellent figures of every Genus of this order.

Battarra *Fungorum Agris Arminiensis Historia*, printed at Rimini, 1755. 40 plates.

Schæffer *Bavarian Fungi*, published at Ratisbon, 1780.

At the time Bolton's History was being issued, M. Bulliard was publishing in Paris a work entitled 'Champignon de la France,' wherein, says Bolton, 'are a great number of very beautiful figures, displaying, in a most superior manner, the Fungi of that kingdom.'

Jacquin's 'Flora Danica' is also referred to, after which

Bolton adds ‘ and in the excellent work of our own countryman —Mr. William Curtis, entitled *Flora Londiniensis*, now publishing in numbers, are given, interspersed with other plants, many accurate figures and descriptions of Fungusses, so that we may hope in time to say that this extensive branch of Natural History is no longer a chaos, or a shame to the science of botany.’

Schæffer, Bulliard, Jacquin and Curtis were all contemporaneous with Bolton, and, along with him, exercised a stimulating influence on the study of Fungi in this country.

Bolton was fully aware of the probability of one and the same species being described simultaneously under different names. He says he always had ‘ an aversion to the unnecessary multiplying of names in our botanic nomenclature ; and there is no order of plants, where we are so likely to slip into errors of this kind as in the Fungusses.’

‘ There is a pride in man, to be thought the inventor or discoverer of something new. In regard to things useful, this is a laudable vanity ; but to add a new name to a known plant or other subject in Natural History, because we meet with an individual perhaps distorted in its shape, diminished or increased in quantity, sickened by improper food or soil, or tinged with colours different from those of its own species, this is not only vain and ridiculous in itself, but pernicious in its consequences. It is not, however, at all times to be guarded against without a long acquaintance with the subjects under notice, especially where their specific characters are less defined and less obvious, as is the case with most of the plants which constitute the most numerous and extensive class, the Cryptogamia.’

‘ The incongruity of names . . . . is a stumbling block in the way of science, It is an evil, however, that must at present be [put up] with, because it is an unavoidable one ; for when several men, strangers to each other, and in different kingdoms, are engaged in the same pursuit ; suppose the same object should fall into the hands of each, and is unknown to them all, each finds it necessary to give it a name, at least a specific one, and he wishes to give it such an one as will be someway or other expressive of the object under review. . . . But men’s ideas and apprehensions vary much—so that under the above circumstances, if the same object should fall under the notice of twenty different discoverers, that five out of the twenty should denominate it by the selfsame term, is little less than impossible. This is the principal cause of that confusion of names, which is every day increasing, and which cannot easily be removed, especially in regard to plants of this order. To attempt it at present would be in vain, because the investigation of them is a branch of science now cultivated with spirit in several parts of Europe; and the field for new discoveries is still so ample, and so rich, that every new season deepens the columns of our former lists, and makes continual additions to the stock, which does not perhaps exhibit more than one-fifth part of the objects that must be investigated before mankind can be possessed of a complete nomenclature.'

Even after all these well-meant and accurate observations, we unhesitatingly excuse Bolton for making four plates of *Armillaria mellea,* and describing each under a different name. This agaric is so extremely variable in appearance that it is surprising he did not make twice as many plates of it. He wrote an 'Essay towards a Methodical Arrangement of Agarics.' Their classification was based on the number of gill series; the presence or absence of stem, of volva, of veil, etc.

Towards the end of his work, Bolton remarks :—' Throughout this work I have endeavoured to clear the subject from these difficulties wherewith it has long been encumbered. In some species, indeed, it was very difficult to determine with precision; the plants are so very similar in figure; so very different in appearance, at different stages of their growth . . . and so confounded by authors, that a man might spend his whole life amongst them, in order, clearly and accurately, to ascertain their species. . . . I have made use of all the lights I could obtain from the works of Linnæus, Hudson, Scopoli, Haller, Vaillant, Micheli, Battara, Sterbeeck, Gleditsch, Dillenius, Ray, etc., etc., and after all, I willingly submit my observations to the few who have studied the subject as devoutly as myself, to alter, change, or totally reject, such as are wrong, and I hope that those few, knowing the difficulties that attend the undertaking, will candidly overlook and forgive such small mistakes as have escaped me.'

A paragraph like this reveals the inner nature of the man—modest as to his own work; admitting that some of it may prove inaccurate as more light is thrown upon the subject, and welcoming any necessary alteration or total rejection. What could the man do more? Accuracy appears to have been his sole aim.

A German translation of his Halifax Fungusses was issued at Berlin in four parts—1795, 1797, 1799, 1820. The first three were by K. L. Willdenow. There are a few alterations which I suppose he would consider emendations. 'There are 16 pages of Preface. The translation of Part IV. is by the brothers C. G. and T. F. L. Nees Von Esenbeck, with additional matter including 'Synopsis Generum Plantarum mycetoi dearum.' The outlines of the figures are accurate, usually ; the figures are often rearranged, often reversed . . . . almost all badly coloured, *i.e.*, colour too vivid, and too dense, frequently different in tint from the original and incorrectly applied. In preface to Part I., Willdenow says :—' Bolton's work is rare in Germany, and of a high price, and that he has translated the text with great care.'* The first part being issued four years prior to Bolton's death, one would almost think some arrangements had been made with him for its translation, but there are no indications in the German issue that any were.

Bolton's other works are :—' A History of the British Proper Ferns,' (illustrated), 1785, the first Monograph of Ferns ever published in any country. In 1790, a Supplement was issued containing the British 'Horse-tails.' 'Essay towards the Natural History of the British Song Birds.' There are 24 supplementary, unpublished drawings of Fungi—1788-1794, in the British Museum (Nat. Hist.), also about 50 drawings of flowers, etc. He did a series of plant drawings for Relhan's 'Flora Cantabrigiensis,' 1785.' He was a member of the Natural History Society of Edinburgh. He sent Cryptogamic plants to J. Dickson, London (Fasc. II., pp. 59 and 86).

Hudson, in 'Flora Anglica,' acknowledges his indebtedness to Bolton among a few other British botanists, for assistance in its production. The same Flora (1788) registers *Geaster fornicatus* sent from Doncaster by a Dr. Tofield.

Dr. Thomas Flintoff, Knoyton, and Edward Robson, Darlington, sent fungi to Bolton, who refers to them as two 'diligent and well informed botanists.' Robson also corresponded with Sowerby and Withering. He was one of the original associates of the then (1789) newly formed Linnæan Society. He sent a drawing of a Geaster to the 'Gentlemans' Magazine,' Feb., 1792.

In the Transactions of the Linnæan Society, Vol. ii., 1794, Robert Teesdale enumerated 33 species of Yorkshire Fungi.

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* A. Gepp, Brit. Mus. (Nat. Hist.).

They are incorporated in 'A Catalogue of the more rare plants which grow wild in the neighbourhood of Castle Howard.'

In a second paper on the 'Flora of Yorkshire' (Linn. Trans., Vol. v.) Teesdale added considerably to his first catalogue of 960 species, bringing the total to upwards of 1400: 500 being Cryptogams, the most extensive list of Yorkshire plants made up to that time (Baker, 'Fathers of Yorkshire Botany,' Y.N.U. Trans., viii.).

In James Sowerby's 'Coloured Figures of British Fungi or Mushrooms,' Vol. i., 1797, under *Peziza acetabulum* (Tab. LIX), the author remarks:—'I have been favoured with recent specimens of this Peziza by the Rev. Mr. Budstone, who found them at Sand Hutton, near York, growing on the earth at the bottom of a shady hedge; not, as usually reported, on rotten wood.' In l.c., Vol. iii. (tab. 293), 1803, two Clavariæ are referred to as being sent by the 'Rev. Mr. Hailstone, gathered on Rumbles-moor, a few miles from Bradford, in Yorkshire, in some peat holes.'

Mr. W. Brunton, of Ripon, sent fungi to Sowerby (Eng. Fl., p. 204).

In the 'Botanist's Guide through England and Wales' by Turner and Dillwyn, 1805, (Vol. ii., part 2, p. 744), Dawson Turner, in criticising a lichen from Brimham Rocks, near Ripon, named *Lichen rubiformis* by Brunton, says:—'I have taken the liberty of subjoining a mark of doubt to this plant, because the specimen I saw, the only one ever found, appeared to me merely the leaf of *L. pyxidatus* with *Sphæria mori* growing upon it.' This is the earliest instance of the recognition of the fact that fungi are parasitic in lichens.

In 1824, Mr. John Atkinson, F.L.S., Leeds, wrote a sketch of the Geographical Distribution of Plants in Yorkshire—Wernerian Memoirs, Vol. v. (1824), p. 278. He stated that the County Flora included 290 species of fungi.

Charles Waterton, the noted Naturalist of Walton Hall, near Wakefield, had an article in the 'Architectural Magazine,' (August, 1835, ii., pp. 361-2) 'On what is commonly called dry rot.' The following year he contributed an article to Louden's Magazine, (Feb. 1836, ix., pp. 74-79) on 'Fungi destroying Sycamore trees in Yorkshire.'

In 1851, a W. Anderson contributes a note to the 'Naturalist' (April, p 48) ' on a large fungus allied to Lycoperdon, at Fulford, Yorks.

The Rev. R. Wood, of Woodhall Park, near Wetherby, recorded in the 'Naturalist,' (Nov. 1852 p. 255) a rare fungus—*Geaster*, allied to *G. collegens*, and *G. hygrometricus*, but distinct from either.

The talented and venerable botanist, John Gilbert Baker, F.R.S., F.L.S., etc., for nearly forty years the valued keeper of the Royal Herbarium, Kew, collected fungi about Thirsk, from 1852-1865. Few other Yorkshiremen appear to have been giving them attention about that time. Mr. Baker corresponded with the Rev. Andrew Bloxam, a student of fungi among other things, at Harborough Magna. In June 1904, Mr. Baker kindly forwarded me, through the Kew authorities, a fine duplicate collection of dried fungi. Among them were many Thirsk specimens and numerous foreign species. Owing to the unfortunate miscarriage of a letter, the Thirsk species were not included in the Yorkshire Fungus Flora. Some future opportunity may arise of inserting them in a supplementary list. Mr. Baker was one of the first Presidents of the Union. He was born at Guisborough, North Yorks., in 1834. He commenced to study botany before he was twelve; at thirteen he was appointed curator of the herbarium at the Friend's School at York; at sixteen he was writing to the 'Phytologist' on the occurrence of Carex Persoonii in Yorkshire; at thirty-two he was appointed first assistant in the Royal Herbarium, Kew. He got through an enormous amount of botanical work. There is an excellent account of him and his work, with photo, in the January 1907, 'Naturalist.'

In 1857, the Rev. F. O. Morris, of 'British Bird fame,' noted the mushroom—*A. campestris*, at Kilnwick Percy, so late as Nov. 21st, ('Nat.' Jan., 1858, p. 10).

In 1858, Mr. E. J. Maude, Leeds, recorded the altitudinal range of the mushroom—*Ag. campestris*, as up to 1,400 feet, on the slope of Old Cote Moor, near Arncliffe, Sep. 11th. ('Nat.', Dec., 1858).

The forerunner of the present Union was the West Riding Consolidated Naturalists Society. Its place of birth was Heckmondwike, in 1861. There were Naturalists present from the Huddersfield, Halifax, and Wakefield Societies. The idea of a Confederation of Societies originated with Mr. William Talbot, Wakefield. The interests of the members were chiefly confined to the more familiar sections of natural history. In 1864, there were six of these Societies. At a quarterly meeting held at

Huddersfield, May 7th, Huddersfield, Halifax, Wakefield, Heckmondwike, Leeds, and Norland were represented. Results were published in a series of 'The Naturalist,' which ,unfortunately, had a run of only three years—1864-1867. This was again revived in August, 1875, as a 'New Series,' under the able joint editorship of C. P. Hobkirk and G. T. Porritt, afterwards by W. Denison Roebuck. It is still flourishing, and is likely to so continue. The Wakefield Society were the first to record fungi in the New Series, next came Goole, then Bradford.

At the 15th Annual Meeting, held at Battyford, near Mirfield, sixteen species of fungi, among other things, were collected. Now the era of renewed activity among Yorkshire Fungi opens.

At the Pontefract Meeting of the W.R.C.N.S., held on Easter Monday, 1877, it was decided to reconstitute the Society, change the name to the Yorkshire Naturalists' Union, and inaugurate a wider sphere of interest. Provision was made for the admission of members not attached to any local Society, and sections were formed for the several branches of natural history. Efforts were made to promote the study of what had hitherto been the 'neglected orders,' and among them, the fungi. The members who interested themselves in this branch were Mr. George Brook, Huddersfield; Dr. H. Franklin Parsons, Goole; Rev. W. Fowler, Liversedge; Messrs. Thos. Hick, Leeds; W. West, Bradford; and W. N. Cheesman, Selby. The Rev. W. Fowler was unanimously elected President under the new arrangement, thus being first President of the Union as at present constituted. Mr. W. Denison Roebuck, who had been joint Secretary of the W.R.C.N.S., was appointed General Secretary. During the course of the meeting Dr. Parsons reiterated the advice put forth by the President with respect to giving more attention to the 'neglected orders,' and pointed out the necessity of obtaining perfect specimens, and of making accurate memoranda of localities, and specimens brought to the meetings. After this, records of observations of fungi, made at the Union Excursions, became pretty frequent. They were principally by Dr. Parsons until 1879, then by W. West, Rev. W. Fowler, G. Massee and H. T. Soppitt until 1893.

Mr. Hobkirk records eighteen species in his valuable book:—'Huddersfield: its History and Natural History,' published in 1868. These are all parasitic, the author remarking 'the other tribes have not been studied in this neighbourhood.' He occasionally exhibited micro-fungi at the meetings of the Huddersfield Society.

The list of South Yorkshire Fungi in Dr. Aveling's 'History of Roche Abbey,' 1870, is by John Bohler, a Derbyshire artizan stocking weaver. Bohler's early tastes led him to gather plants; later, he collected medicinal plants; he then took up the science of plant study, and became an expert field-botanist and microscopist. He made a special study of lichens. About 1860, he explored Snowden, and adjacent mountains and hills, under the auspices of the Botanical Committee of the British Association. He next became a great collector and student of fungi, hence Aveling's list of ninety species. He compiled a Flora of Sherwood Forest for White's 'Worksop.' He often pursued his natural history at the expense of his ordinary employment, in consequence of which he became poor, and tried to obtain a bare subsistence by the sale of micro slides of moss peristomes, parasitic fungi, etc.

In 1872, the 'Entomologists' Monthly Magazine' refers to *Coprinus comatus* in York Cemetery in connection with a beetle.

The first mention of Dr. Franklin Parsons in 'The Naturalist' is Nov. 1876, when he records twenty species of fungi found at Goole. His acquaintance with Yorkshire botany dates from 1874 to 1879, during which time he resided at Goole. He formed the Goole Scientific Society in 1875, and acted as its secretary until 1879. He was also the means of organising a Natural History Society at Selby: Mr. Cheesman, a member of our Mycological committee, being one of the results. Dr. Parsons was botanical secretary of the Union during the years 1877-8-9. Records of observations made at the Union Excursions, as well as other times, were regularly kept. He carefully investigated the Goole district, and in his report to that Society for 1878-79, submitted a long list of Cryptogams, including 179 fungi, and it must be remembered, Goole is not a particularly rich locality for this class of plant. I have been favoured by him with a long list of species he has observed in various places in Yorkshire. Mr. Fowler warmly testifies to the doctor's diligence in determining his finds. He left Goole in 1879 to take up an important appointment as one of the Medical Inspectors under the Local Government Board. This he still holds, and resides at Croydon.

The Rev. Canon Fowler has taken an interest in this subject since the early seventies. He tells me he caught the infection for studying fungi from Dr. Parsons. They studied them together at the Union Excursions for many years. From time to time Mr. Fowler has contributed numerous records of species seen during the excursions to the 'Naturalist.' Apart from these, Coxley Valley was the locality he mostly investigated. Several uncommon species have rewarded his search. He met with a particularly rare one—*Lentinus leontopodius*—at Crowle, just within the border of Lincolnshire: this had not been seen in our county until last July, when it was found on some old timber near Huddersfield, by B. Goldthorpe, of Milnsbridge. Mr. Fowler has been a member of the mycological committee since its formation, and was its first chairman. At the Harewood and East Keswick Foray, 1898, he gave a most interesting address on 'Mycology in its Popular Aspect,' ('Nat.', October, '98). This will well repay careful perusal.

Mr. George Brook read a paper on 'Salmon Disease' at the Huddersfield Societies' meeting, April, 1877—('Nat.' iii., p. 145) He also noticed bream affected with Saprolegnia in the fish-pond at Walton Hall, Wakefield. Mr. Brook was then Secretary of the Huddersfield Society. He carried on biological investigation for some years by means of his large well-equipped private aquarium at Huddersfield. He was a F.L.S. In 1885 he was appointed Naturalist to the Fishery Board for Scotland, and later became Lecturer of Comparative Embryology in the University of Edinburgh.

Mr. W. West, Bradford, began the study of botany in boyhood. In 1870 he took it up in earnest. At the early Union excursions he rubbed shoulders with Dr. Parsons, Messrs. W. Fowler, James Abbott, Thos. Hick, and others. He was one of the early members of the Bradford Natural History Society (formed 1875). In 1878 he lectured to the Bradford Scientific Association, of which he was one of the earliest members, on Fungi, and exhibited a large number of fungal leaf parasites. Mr. H. T. Soppitt attended, and thence forward took a keen interest in the subject. The two worked together in their botanical studies for years, and added considerably to the knowledge of West Riding fungi. Their first hunting grounds were Bingley, Hawksworth, and Heaton, near Bradford. Berkeley's 'Outlines of British Fungology (1860)' and 'Cooke's Handbook (1871)' were then the most recent British systematic text-books—both most excellent works. Mr.

West was cryptogamic secretary to the Union, 1879-80. His first report was on the results of an excursion to Hebden Bridge ('Nat.', August, 1879). Erelong, his increasing business of chemist and druggist left him little time to give to field botany, and he was compelled to drop fungi, but encouraged Soppitt to continue. Although West found it necessary to drop this section, he continued to study mosses, hepatics, lichens, and algæ; these could easily be laid by and worked out as opportunity afforded. Eventually Mr. West became wholly engaged in the teaching profession as Lecturer in Biology, etc., at the City of Bradford Technical College. He and his son, Prof. G. S. West, Birmingham University, are the best known authorities on fresh water algæ. Mr. West was Chairman of the Union in 1899.

At the meeting of the Leeds Naturalist Club and Scientific Association, October, 1876, Mr. Thos. Hick delivered a lecture on 'Mushrooms,' dealing with their structure and physiology. A number of edible and poisonous species were exhibited in illustration of the lecture. Mr. Hick continued his botanical studies, obtained the degrees B.A., B.Sc., etc., and was appointed Assistant Lecturer in Botany, under Prof. Williamson, at the then Owen's College, Manchester, 1885, in succession to Mr. Marshall Ward. He became proficient in paleo-botany.

We must take our thoughts back for a moment to the dim past, when the Halifax Coal Measures were in process of formation on the surface. We have evidence that even at that remote period fungi were at work. In 1878, Messrs. W. Cash and T. Hick discovered traces of their presence in the shape of fossilized spores, mycelium, etc. in these beds. They were described and recorded in the Proceedings of the Yorkshire Geological and Polytechnic Society (1879, pp. 115-122). The two able authors generously inform us that the material and sections showing these traces of fossil fungi were found and cut by the late James Binns, a Halifax quarryman, and a field botanist. Further evidence of a similar nature was found by Prof. Williamson, in sections cut by the late James Spencer, who long resided within a few hundred yards of our present meeting place. Spencer was an ardent geologist and palæontologist. Both Spencer and Binns were well known to such distinguished palæo-botanists as the late Prof. Williamson, Count Solms Laubach, and the late Dr. Hovelacque, for their exquisite micro preparations of fossil plants.

Dr. Weiss has met with still further evidence in a section of a Halifax coal-measure fossil plant in the Cash collection at Manchester University.—('New Phytologist,' March, 1904).

The late H. T. Soppitt joined the Bradford Society in 1876. He, along with Messrs. West, J. W. Carter, and others, catalogued the plants of that district, including cryptogams. One of Soppitt's first records was *Melampsora vitellina*=*Lecythea calyceta*, parasitic on willow leaves at Saltaire. In 1877 he decided to try his hand at investigating some of these plant parasites, so far as his spare time would allow. He had good eyesight, and a most retentive memory. He looked forward to the first Y.N.U. Fungus Foray, 1881, when three of the few British experts were to be present. The following year he recorded between forty and fifty species of fungi, found at the Haigh excursion in September, and ninety at the Thirsk meeting the month after. The pages of 'The Naturalist' testify to his continued diligence on numerous subsequent occasions.

His researches in the Uredines unravelled the life histories of several species 'which had previously been enshrouded in mystery, or wrongly interpreted.' Dr. Plowright remarks:—'Prior to Soppitt's work, the *Æcidium* and *Puccinia* on *Adoxa Moschatellina* were regarded as being of the same species, but he demonstrated that . . . they had no relationship.' He next cleared up the life-history of *Æcidium leucospermum*, which occurs on *Anemone nemorosa*, showing it, by careful experimental cultures, to be an *Endophyllum*, and had no connection with *Puccinia fusca* which occurs on the same plant.—(Jour. Bot., Sep., 1893). Dr. Plowright further says 'He attacked that complicated problem, the life-history of the *Puccinia* on *Phalaris arundinacea*, proving that the *Æcidium* on *Convallaria majalis* belonged to one of them, which he named *P. digraphidis*, thereby opening a discussion amongst Continental botanists as to the relative value of these specific forms.' He was the first to demonstrate the connection of an *Æcidium* on earth-nut—*Conopodium denudatum* with a *Puccinia* on sweetdock—*Polygonum Bistorta*. In 1892, on a visit to Hardcastle with myself, and Needham and Pickles of Hebden Bridge. Needham said they had noticed a yellow fungus on earth-nut, and where this occurred, the surrounding sweetdock plants were soon after affected with a brown one. This information led Soppitt to undertake a series of experiments with a view to ascertain whether any relationship existed between the two. Eventually he succeeded in proving they were but two separate stages on different hosts in the life-history of one and the same fungus—*Puccinia Bistortæ,* (Grevillea xxii. (1893), pp. 45-47). A most interesting popular account by Soppitt may be found in the Halifax Naturalist, vol. ii., pp. 108-113.

He tested *Puccinia variabilis* which occurs on dandelion leaves at Grassington, and found that all the three stages in the life cycle of this fungus were confined to that plant.

In 1894 he removed to Halifax. By so doing, the study of fungi in this district got a decided help forward. Later he checked and confirmed Klebahn's cultures of *Puccinia Pringsheimiana* on the gooseberry bush, and *Carex vulgaris,* proving the *Æcidium* on the gooseberry, and the *Puccinia* on the Carex to be the same fungus. He procured the *Æcidium* stage from a wild gooseberry tree at Windermere, and successfully infected *Carex* plants in his own garden at Halifax with the disease.

He discovered several species new to science, all of which are included in the Yorkshire Fungus Flora.

Dr. F. A. Lees, in 'Flora of West Yorkshire,' acknowledges his indebtedness to Soppitt for compiling the list of Fungi. He, along with Thos. Hebden, Cullingworth were the principal contributors to the fungi in Rotheray's 'Flora of Skipton.' For further particulars see 'Gardiner's Chronicle, 'April 15th, 1899; 'The Naturalist,' May, 1899; and the 'Halifax Naturalist,' vol. iv.

Yorkshire owes much to the study of its fungi to Geo. Edward Massee. In his signature Mr. Massee, for the sake of brevity, omits his second Christian name. He is a Yorkshireman, born at Scampton, E.R., 1850. He was first attracted to fungi by specimens brought to the York School of Art, where he was a student in 1867. His first collecting grounds were Castle Howard Woods, and Terrington Carr. Removing to Scarborough in 1873, he studied the fungi of that district for fifteen years. During that period he discovered many species new to science, and others new to the British Flora. The former are figured in Dr. M. C. Cooke's fine set of Illustrations of British Agaricaceæ. This monumental work also contains numerous other drawings from Massee's dexterous pencil. There are also many in the British Museum (Natural History) collection.

(*To be continued*).

THE ICE-BORNE BOULDERS OF YORKSHIRE.

J. H. HOWARTH., J.P.. F.G.S.
Halifax.

At the annual meeting of the Yorkshire Naturalists' Union in 1906, it was decided on its own recommendation to re-christen the Yorkshire Boulder Committee, and to call it in future 'The Glacial Committee.' The alteration did not effect much change in the constitution of the Committee, but was intended theoretically to broaden the basis of research, and practically to make the title more accurately describe the work to which the members had of recent years devoted their principal attention.

After twenty years of active research, the present seems a fitting time to review the work of the Boulder Committee*, and to present the results in a more condensed form than the long and scattered series of reports afford.

It falls to the lot of the present writer, therefore, to undertake this duty, as the last and only survivor of the four Honorary Secretaries since the Committee was formed. His three predecessors, Mr. Samuel A. Adamson, Mr. Samuel Chadwick, and Mr. Thomas Tate have all passed over to the majority.

On the 23rd November, 1886, in response to a circular issued by Mr. S. A. Adamson, a meeting was held in the Mechanics' Institute, Leeds, and the Yorkshire Boulder Committee was then duly formed, and has been in active work ever since.

During these twenty years the whole county has been examined, and much of it again and again. It will probably be correct to say that there is hardly an acre of ground, certainly not a square mile, within the county, which has not been searched for traces of glacial phenomena by members of the Committee, and others interested in their behalf. The open moors and fells, the peaceful valleys, the secluded glens and wild mountain gorges have all been hunted. Railway cuttings, trenches for waterworks, deep borings, drainage operations, brick works, building foundations, in short, sections of all kinds (many made for the purpose), have been noted and watched with patient and persistent care.

In addition to this, many excursions have been made outside the county for the purpose of studying areas and rocks which have furnished boulders to the Yorkshire drift. Further, a number of prominent geologists within and without the county and not on the Committee, have been called into willing service. Many members of the Geological Survey have given valuable assistance, including Messrs. A. H. Green, J. G. Goodchild, J. R. Dakyns, R. H. Tiddeman, T. McKenny Hughes, C. Fox-Strangways, G. W. Lamplugh, E. H. Cunningham-Craig, and H. Brantwood Muff.

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* For a detailed account of this Committee's work, see 'The Yorkshire Boulder Committee and its work: a Retrospect,' by T. Sheppard, 'Nat.', 1902, pp. 217-222.

Distinguished Petrologists have also been requisitioned, including Messrs. J. J. H. Teall, Alfred Harker, Professor Brögger, of Christiania, and Dr. Munthé, of Upsala. These have all rendered invaluable help in examining and identifying certain rocks for the Committee.

The Chairman of the Committee (Professor Kendall) made a special visit to Southern Norway, and brought back rock specimens and information which have been of immense service and interest to the workers.

No account of the Boulder Committee can do justice to the subject which does not specially recognise the services of Professor Percy Fry Kendall. The researches had been steadily pursued for some years, a great number of records made, and much preliminary work done. But the advent of Professor Kendall gave alike a great impetus and a new interest to the task. Since 1896 he has been Chairman, and the life and soul of the Committee. He has inspired the members with enthusiasm, directed their efforts, checked their records, furnished numberless records himself, and interpreted results by his own illuminating comments and discoveries.

An acknowledgement must also be cordially made to the Council of the Yorkshire Geological Society, who have on several occasions arranged their own excursions with the express object of furthering the work of the Boulder Committee. The Society made excursions to the English Lake District, the Cheviots, and to South Scotland, which the Yorkshire Naturalists' Union could not well have undertaken.

The invasion of foreign ice has always made our East Coast the *centre* of interest for boulder distribution. Every searcher has looked upon the sea coast as a sort of glacial Mecca, to which he must make as many pilgrimages as possible, and the inland investigator has regarded with envy the East

Riding man who resided within touch or easy reach of the promised land.

Certain members of the Hull Geological Society have *existed* as well as they might, in the hinterland about Hull and elsewhere, but they have really *lived* the joyous part of their lives upon the coast, studying its complicated geological and glacial phenomena, and revelling in the vast collection of boulders to be found there. To the work of these, the Committee owes a debt of gratitude, and rich stores of information. Probably every yard of the shore, accessible at low tide, from the Spurn to the Tees, has been searched at one time or other.

The grapes brought back from this promised Land have happily had the effect of encouraging those who lived further inland to see what might after all be made of their own less fertile soil, and no little credit is due to many who have searched for scores of days and found nothing to put down in official records, but who have, nevertheless, accumulated the negative evidence which is essential to accurate conclusions.

In endeavouring to focus the results of the Boulder Committee's work, it will be advisable only to deal with such rocks as are foreign to the county, and of types which are capable of definate identification, and which enable their actual or approximate original sources to be stated with tolerable certainty.

While this method leaves out of count many hundreds of records, such as 'Whinstone,' 'Basalt,' 'Trap,' 'Dolerite,' etc., etc. (which terms afford insufficient descriptions), and also sorts out thousands of records of inter-county and local distributions of erratics, it has the advantage of bringing more clearly into our review those rocks which, just because they can be identified, best illustrate the facts of source, route, and distribution of erratic boulders which have reached Yorkshire, so far as those facts are at present known.

This report makes no claim to be complete, and still less any pretence of being final.

To begin with, then, it is clear that Yorkshire has been invaded by foreign ice, *i.e.*, ice foreign to the county; ice foreign to *England* (let us say); and ice foreign to Great Britain altogether.

(*To be continued*).

A NEW COPRINUS.

THOMAS GIBBS.
Wirksworth.

COPRINUS CORDISPORUS, Gibbs, n. sp.

Pileus at first cylindric-ovate, then expanded, at length upturned, very thin, plicate-sulcate, splitting along the backs of the gills, margin crenate, 6-9 mm. across, whitish or pallid ochraceous, disc sprinkled with tawny furfuraceous papillæ. Gills free, but ending close to the stem, rather narrow, 25-30 in number in the larger pilei, intermediate shorter ones few or none. Stem 2 cm. long, filiform, hollow, whitish-hyaline, glabrous except at the base, which is slightly thickened and densely strigose-squamulose. Spores dark brown-purple, laterally compressed, front view obtusely cordate 9-10 μ. diameter, side view elliptical, 5-6 μ. thick. Cystidia cylindric-fusiform 50 × 10 μ.

On dung of Horse, Sheep, Rabbit, etc, Sheffield, Farnley Tyas and Buckden, West Yorkshire; Wirksworth, Derbyshire.

This pretty little species was first found by me in April 1904, near Sheffield. In April 1906, it turned up in this (Wirksworth) district, and since that date I have had it more or less constantly under observation. The features which specially distinguish it from other nearly related small species are the persistent furfuraceous papillæ on the disc, the densely squamulose foot, and the obtusely heart-shaped compressed spores.

Sometimes the squamulose area at the foot of the stem ends definitely in a sort of strigose ring.

Coprinus cordisporus, Gibbs, sp. nov.

Pileo aliquandiu cylindrico-ovato, tunc expanso, posthac sursum curvato, tenerrimo, plicato-sulcato, tandem ad partem dorsalem lamellarum fisso, margine crenato, latitudine 6-9 mm., subalbo vel pallido ochraceo, disco papillis fulvis furfuraceis vestito. Lamellæ liberæ sea juxta stiptem terminatæ, subangustæ, 25-30 numero in pileis majoribus, cum paucis vel nullis lamellis brevioribus intermediis. Stipes 2 cm. longitudine, filiformis, fistulosus, subalbo-hyalinus, tumidus et squamulosus ad basin, glaber in parte superiori. Sporæ fusco-purpureæ, lateraliter compressæ, ad frontem visæ obtuse cordatæ, 9-10 μ. diametro, ad laterem visæ ellipticæ 5-6 μ. crassitudine. Cystidia cylindrico-fusiformia 50 × 10 μ.

In fimo Equorum, Ovium et Cuniculorum.

ALGÆ FROM AUSTWICK MOSS, WEST YORKS.

WM. WEST, F.L.S.,
AND
G. S. WEST, M.A. (Cantab.), F.L.S., etc.

From a few gatherings made from time to time on Austwick Moss, we have noted the following species, none of which have been previously recorded for this locality; some are new to Yorkshire, and some new to West Yorkshire. We have by no means ascertained all the species occurring on the moss, the list given representing the species noticed in the gatherings we examined. The moss is yet in some parts primitive, and in wet seasons one has to be careful where one treads.*

Before enumerating the algæ, it will be as well to portray the nature of the ground, giving a list of some of the larger plants, some of which are immediate associates of the Algæ, and at the same time it will be more interesting to the general reader. The moss has been partially drained, yet a large number of plants which always gladden the eye of a field-botanist, still linger in plenty on the moss, where it is no difficult matter even now, to find wet places. Among these are:—*Viola palustris*, *Comarum palustre*, *Drosera rotundifolia*, *Taraxacum officinale* var. *palustre*, *Andromeda polifolia*, *Vaccinium Oxycoccos*, *V. Vitis-Idæa*, *Primula farinosa*, *Pinguicula vulgaris*, *Myosotis scorpioides*, *Pedicularis palustris*, *Veronica scutellata*, *Salix repens*, *S. aurita*, *Myrica Gale*, *Triglochin palustre*, *Habenaria bifolia*, *Orchis incarnata*, fine forms of *O. maculata*, *Narthecium ossifragum*, *Schoenus nigricans*, *Eriophorum latifolium*, *Carex vesicaria* (with about twenty other species on the moss and in its neighbourhood), *Blysmus compressus*, *Selaginella selaginoides*.

On the way to the moss from Clapham, the following among others can be seen:—*Nymphæa lutea*, *Geranium sylvaticum*, *Poterium sanguisorba*, *Anagallis tenella*, *Campanula latifolia*, *Potamogeton crispus*, *P. densus*, *Scirpus lacustris*, *Allium Scorodoprasum*, *Cystopteris fragilis*, *Asplenium Trichomanes*, *A. Ruta-muraria*.

LIST OF ALGÆ.

Batrachospermum moniliforme Roth.

Œdogonium rufescens Wittr. New to Yorkshire.

,, *Itzigsohnii* De Bary.

Bulbochaete, several barren species.

Ulothrix subtilis Kütz. var. *variabilis* (Kütz.) Kirchn.

Binuclearia tatrana Wittr. New to Yorkshire.

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* One of us crosses this rich moss annually with a number of ladies' who have to be carefully piloted; the gentlemen are usually left to seek their own dry path.

Microspora abbreviata (Rabenh.) Lagerh.

,, *floccosa* (Vauch.) Thur.

Microthamnion Kützingianum Näg.

Mougeotia viridis (Kütz.) Wittr.

Zygnema ericetorum (Kütz.) Hansg.

,, several barren species

Spirogyra, several barren species

Cylindrocystis Brebissonii Menegh

Netrium Digitus (Ehrenb.) Itzigsh. and Rothe.

,, *interruptum* (Bréb). Lütkem.

Closterium Cynthia De Not. New to Yorkshire

,, *costatum* Corda.

,, *striolatum* Ehrenb.

,, *juncidum* Ralfs.

,, *Dianae* Ehrenb.

,, *parvulum* Näg.

,, *Jenneri* Ralfs.

,, *Venus* Kütz.

,, *Leibleinii* Kutz.

,, *Lunula* (Müll.) Nitzsch.

,, *gracile* Bréb.

,, *Kützingii* Bréb.

Pleurotænium Ehrenbergii (Bréb.) De Bary.

Tetmemorus lævis (Kütz.) Ralfs.

Euastrum oblongum (Grev.) Ralfs.

,, *ansatum* Ehrenb.

,, *bidentatum* Näg.

,, *binale* (Turp.) Ehrenb f. *Gutwinskii* Schmidle. New to Yorkshire.

Euastrum pectinatum Bréb.

,, *ansatum* Ralfs.

,, *verrucosum* Ehrenb.

,, *dubium* Näg.

Micrasterias truncata (Corda) Bréb.

,, *papillifera* Bréb.

,, *denticulata* Bréb.

,, *Crux-Melitensis* (Ehrenb.) Hass. New to W. Yorkshire.

Cosmarium subtumidum Nordst.

,, *margaritiferum* (Turp.) Menegh.

,, *Brébissonii* Menegh.

,, *margaritatum* (Lund.) Roy and Bisset; New to Yorkshire.

Cosmarium Portianum Arch.

,, *tetraophthalmum* (Kütz.) Menegh.

,, *De Baryi* Archer.

,, *quadratum* Ralfs.

,, *anceps* Lund.

,, *granatum* Bréb.

,, *pygmæum* Archer. Abundant. (We also have this from Ingleborough, Ribblehead, near Halifax, &c.)

Cosmarium difficile Lütkem. var. *sublæve* Lütkem.

Cosmarium Cucurbita Bréb.

Xanthidium fasciculatum Ehrenb. New to W. Yorkshire.

Arthrodesmus Incus (Bréb.) Hass.

,, *convergens* Ehrenb.

Staurastrum aciculiferum (West) Anders.

,, *brevispinum* Bréb.

,, *cuspidatum* Bréb.

,, *furcatum* (Ehrenb.) Bréb.

,, *Reinschii* Roy.

,, *teliferum* Ralfs.

,, *pilosum* (Näg.) Archer.

,, *dilatatum* Ehrenb. var. *obtusilobum* De Not.

,, *punctulatum* Bréb.

,, *hexacerum* (Ehrenb.) Wittr.

,, *inflexum* Bréb.

,, *polymorphum* Bréb.

,, *oxyacanthum* Archer.

,, *margaritaceum* (Ehrenb. Menegh. The tetraradiate form only.

Hyalotheca dissiliens (Sm.) Bréb.

,, *mucosa* (Dillw.) Ehrenb.

Desmidium aptogonum Bréb. New to W. Yorkshire.

Pandorina morum (Müll.) Bory.

Eudorina elegans Ehrenb.

Pleurococcus vulgaris Menegh.

Pediastrum Boryanum (Turp.) Meneg.

Coelastrum cubicum Näg. New to W. Yorkshire.

Sorastrum spinulosum Näg. New to W. Yorkshire.

Scenedesmus obliquus (Turp.) Kütz.

Ankistrodesmus falcatus (Corda) Ralfs.
Kirchneriella obesa (West) Schmidle
Oocystis solitaria Wittr.
Nephrocytium Agardhianum Näg.
Eremosphaera viridis De Bary.
Tetraëdron enorme (Ralfs) Hansg. New to W. Yorkshire.
Dictyosphærium Ehrenbergianum Näg.
Botryococcus Braunii Kütz
Ineffigiata neglecta W. and G. West.
Glœocystis gigas (Kütz.) Lagerh.
,, *vesiculosa* Näg.
Chlorobotrys regularis (West) Bohlin.
Ophiocytium parvulum (Perty) A. Br.
,, *majus* Näg.
Dinobryon Sertularia Ehrenb.
,, *cylindricum* Imhof. var. *divergens* Lemm.
Cyclotella operculata Kütz.
Synedra radians (Kütz) Grun.
Nitzschia Palea (Kütz.) W. Sm.
Eunotia lunaris (Ehrenb.) Grun. A form with the valves very long and narrow.
Navicula major Kütz.
,, *viridis* Kütz.
,, *Brébissonii* Kütz.
Navicula Tabellaria (Ehrenb.) Kütz
,, *gibba* (Ehrenb.) Kütz.
,, *radiosa* Kütz.
,, *exilis* (Kütz.) Grun.
,, *Iridis* (Ehrenb.) V.H. var. *Amphirhyncus* (Ehrenb.) De Toni.
,, *Hilseana* Janisch.
Stauroneis Phœnicenteron Ehrenb.
Vanheurckia rhomboides (Ehrenb.) Bréb. var. *Saxonica* Rabenh.
Cocconema cuspidatum (Kütz.) G. S. West.
,, *gracile* (Rabenh.) G. S. West.
,, *Cistula* Ehrenb.
Epithemia turgida (Ehrenb.) Kütz.
Nostoc microscopicum Carm.
Lyngbya Martensiana Menegh.
Phormidium tenue (Menegh.) Gom.
Oscillatoria major Vauch. New to Yorkshire.
,, *tenuis* Ag.
Merismopedia aeruginea Bréb.
Synechococcus major Schröter.
Microcystis incerta Lemm. New to Yorkshire.
Coelosphaerium Kützingianum Näg.
Gomphosphaeria aponina Kütz.
Chroococcus turgidus (Kütz.) Näg.

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Proceedings of the Liverpool Geological Association (New Series) No. 2, 1907. 50 pp., price 2/- (Lord Derby Museum, William Brown St.). This publication contains many geological notes of local interest, as well as one or two relating to Switzerland, etc. Amongst the items may be mentioned 'The Flora of the Coal Measures in relation to the Flora of to-day,' by S. H. Pritchard; 'Some Physical Properties of Local Rocks,' by W. T. Walker; 'Glacial Striæ at Walton,' and 'On a Section of Glacial Drift and Shirdley Hill Sand at Aintree,' by C. B. Travis; and a new record of 'Keuper Marl at Seacombe,' by S. H. Pritchard.

Orkney and Shetland Old-Lore, Nos. 1-5, 1907-8. In January, 1907, the Viking Club commenced a series of valuable publications dealing with the lore of Orkney and Shetland, and the parts have appeared regularly every quarter since. They are sold at 3s. each at the King's Weigh House, Thomas Street, Grosvenor Square, W., and in them can be found much of interest to students of archæology and Folk Lore, the various items being of peculiar interest to residents of Yorkshire and Lincolnshire. The series has been carefully edited and here and there are items of natural history interest. An article on 'Shipping Peats from Orkney' (p. 129), by Mr. J. T. S. Leask, gives some useful information in reference to the peat industry of the island. Elsewhere (p. 91), the birch tree is recorded in the peat of that area. On p. 23 is an article on 'Dividing Seaweed one hundred years ago.' There are several illustrations.

ADDITIONS TO THE LIST OF YORKSHIRE DIPTERA.

JOHN. H. ASHWORTH,
Ilkley.

In looking over lists of Diptera sent with specimens for verification during the last three years (1905-6-7) to the Rev. W. J. Wingate, to whom thanks are due for so kindly examining the specimens, it would appear that a considerable number of species occur and have recently been found in Yorkshire, which are not mentioned in the list prepared by Mr. Percy H. Grimshaw, in the Victoria History of the County of York. It may be advisable, therefore, to treat Mr. Grimshaw's list as a basis for the list of Diptera found in Yorkshire, supplementing it by the publication at intervals of lists of additional species.

In the following list where no name of person appears against place and date, the insect was taken by myself.

Fam. BIBIONIDÆ.

Bibio johannis L. Ilkley, 5th May '07.

nigriventris Hal. Clapham, 30th May, '05; Ilkley, 5th June, '07.

Fam. CHIRONOMIDÆ.

Chironomus annularis Deg. Stanningley, 3rd July, '05.

,, *pedellus* Deg. Harrogate, 1st June, '06.

,, *rufipes* L. Calverley, 2nd Sept., '05.

,, *tentans* F. Castley 3rd May, '06.

Cricotopus bicinctus Mg. Calverley, 28th April, '05.

Tanytarsus pusio Mg. Ilkley, 5th Feb., '06.

Eurycnemus elegans Mg. Pool, 17th August, '06.

Diamesa ammon Hal. Ilkley, 27th June, '06.

Tanypus nebulosus Mg. Pudsey, 5th May, '05.

Fam. CULICIDÆ.

Culex annulatus Schrk. Otley, 7th November, '06.

Fam. PTYCHOPTERIDÆ.

Ptychoptera paludosa Mg. Ilkley, to Addingham, 26th June, '07.

Fam. LIMNOBIDÆ.

Dicranomyia chorea Mg. Thackley, 11th May, '05. Prevalent in swarms about Ilkley during Autumn.

Rhiphidia maculata Mg. Austwick, 26th May, '05; Calverley, 23rd August, '05; Otley, September and October, '06.

Rhypholophus nodulosus Mcq. Ilkley, 20th June, '06; Woodhall (Calverley), 9th June, '05; about Esholt, 27th August, '06.

Limnophila dispar Mg. Killinghall (near Harrogate), 1st June, '06.

Trichocera hiemalis Deg. Common throughout the winter.

,, *regelationis* L. Common throughout the winter.

Amalopis littoralis Mg. Ilkley, July, '06.

Fam. TIPULIDÆ.

Dolichopeza sylvicola Curt. Ilkley, 21st July, '07.

Pachyrrhina guestfalica Westh. Ilkley, 13th July, '06. (Thackley, 8th July, '05) ?

Tipula confusa V.d. Wulp. Woodhall (Calverley), 11th September, '05.

„ *rufina* Mg. Otley, 7th September, '06; Ilkley, 24th May, '07.

„ *hortensis* Mg. Austwick, 26th May, '05; Rylstone, 5th June, '06.

„ *melanoceras* Schum. Rombalds Moor (above Morton), September, '06.

„ *lateralis* Mg. Ilkley, 19th June, '06.; Otley, 5th May, '07.

„ *lutescens* F. Bow Beck, 28th August, '07; Arthington, 10th July, '06; Ilkley, 14th September, '07.

„ *paludosa* Mg. More common perhaps even than *T. oleracea*, especially during the remarkable visitation about Bradford during July and August, 1904.

„ *fascipennis* Mg. Ilkley, 21st July, '07.

Fam. STRATIOMYIDÆ.

Sargus iridatus Scop. Pudsey, 3rd July, '05.

Beris vallata Forst. Thackley, 8th July, '05.; Ilkley, 20th July, '06.

„ *chalybeata* Forst. Ilkley, 24th July, '07.

„ *geniculata* Curt. Thackley, 8th July, '05.

Fam. LEPTIDÆ.

Symphoromyia crassicornis Pz. Stanningley, 24th June, '05.

Fam. EMPIDÆ.

Rhamphomyia nigripes F. Austwick, 26th May, '05; Woodhall, Hills (Calverley), 9th June, '05.

„ *sulcata* Fln. Clapham, 23rd May, '05; Austwick, 26th May, '05.

Empis tessellata F. Allerton, June '06, J. W. Carter; Laisterdyke, June, '04; Bramhope, 12th June, '07.

„ *opaca* F. Clapham, 26th May, '05; Thirsk, 2nd June, '05.

„ *vernalis* Mg. Ilkley, 24th May, '07.

„ *chioptera* Fln. Clapham, 23rd May, '05; Bolton Woods, 31st May, '06; Austwick, 26th May, '05

Hilara maura F. Woodhall Hills, (Calverley). 9th June, '05; Clapham, 26th May, '05; Ilkley, 2nd June, '06.

„ *quadrivittata* Mg. Ilkley, 13th June, '07.

„ *chorica* Fln. Y.N.U., Fewston, June, '06.

Tachydromia flavicornis Mg. Austwick, 26th May, '05.

Fam. DOLICHOPODIDÆ.

Liancalus virens Scop. Addingham Moorside, 29th August, '06; Bow Beck, near Ilkley, 28th August, '07.

Fam. SYRPHIDÆ.

Chilosia antiqua Mg. Ilkley, 7th July, '06, 28th June, '07.

„ *albitarsis* Mg. Ilkley, 28th June, '07.

„ *vernalis* Fln. Bridlington, May, '07.

Ischyrosyrphus glaucius L. Calverley, 2nd September, '05.

Catabomba pyrastri L. Shipley, September, '05, F. Midgley, Wilsden, August, '06; W. R. Butterfield, Ilkley, October, '06. (Common about Bradford, August-September, '05, and may be found every year).

Syrphus tricinctus Fln. Thornbury, 11th September, '05; Wilsden, 7th September, '07, W. R. Butterfield.

„ *lunulatus* Mg. Ilkley, June '07.

„ *cinctellus* Ztt. Bow Beck, Ilkley, 28th August, '07

,, *arcticus* Ztt. Addingham, 15th May, '07.

Chrysochlamys cuprea Scop. Otley, 2nd October, '07.

Sericomyia borealis Fln. Beckfoot Bingley, 3rd August, '06; Wilsden, 7th August, '06, R. Butterfield.

,, *lappona* L. Hood Hill, near Thirsk, 2nd June, '05; Y.N.U., Fewston, June, '06.

Chrysotoxum arcuatum L. Wilsden, August, '07, W. R. Butterfield.

Callicera œnea F. Wilsden, August, '07, W. R. Butterfield.

Fam. CONOPIDÆ.

Myopa buccata L. Wilsden, 9th July, '07, R. Butterfield.

Fam. MUSCIDÆ.

Graphomyia maculata Scop. Woodhall Hills, 24th July, '05; (Saltaire Park, 3rd October, '07, J. A. Beck).

Protocalliphora grœnlandica Ztt. Farsley, 14th July, '05; Ilkley, July, '06, March, '07.

Fam. ANTHOMYIDÆ.

Hyetodesia variegata Mg. Pannal, 25th June, '07.

Mydea vespertina Fln. Ilkley, 20th September, '06.

,, *pagana* F. Addingham, 26th June, '07.

,, *impuncta* Fln. Thackley, 12th August, '05; Y.N.U. (Fewston), June, '06.

Anthomyia pluvialis L. Rodley, 24th June, '05; Leeds, 4th June '05; Stanningley, 3rd July, '05.

Azelia macquarti Stœg. Ilkley, 20th July, '07.

Fam. CORDYLURIDÆ.

Scatophaga inquinata Mg. Ilkley, 5th May, '07.

Fam. HELOYMZIDÆ.

Blepharoptera variabilis Lw. Ilkley, 9th October, '06.

Fam. SCIOMYZIDÆ.

Neuroctena anilis Fln. Ilkley, 23rd July, '06; Otley to Esholt, 8th October, '06.

Tetanocera punctulata Scop. Thirsk (near Kilburn), 2nd June, '05.

Limnia rufifrons F. Ilkley, 4th September, '06.

Fam. PSILIDÆ.

Psila fimetaria L. Thirsk, 2nd June, '05; Y.N.U., Fewston, June, '06; Addingham, 28th June, '07.

Fam. MICROPEZIDÆ.

Calobata cibaria L. Ilkley, 7th July, '06.

Fam. SAPROMYZIDÆ.

Sapromyza rorida Fln. Addingham, 28th September, '06. (Frequent in the Autumn).

Fam. SEPSIDÆ.

Nemopoda cylindrica F. Thackley, 8th July, '05.

Fam. PHYTOMYZIDÆ.

Phytomyza zetterstedtii Schin. Ilkley 8th July, '06.

Fam. BORBORIDÆ.

Borborus nitidus Mg. Ilkley, 22nd June, '06.

Fam. PHORIDÆ.

Phora rufipes Mg. Ilkley, 18th August, '06. (Common).

,, *thoracica* Mg. Ilkley, 28th June, '06.

,, *concinna* Mg. Ilkley, September, '06.

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At a recent meeting of the Conchological Society, Mr. H. Beeston exhibited a living sinistral *Limnæa glabra* from Scarborough.

The January Antiquary contains a useful paper on 'The Querns of Anglesey,' by Prof. E. Anwyl; 'Early Settlements by the Kentish Marshes,' by G. Payne; 'Note on a remarkable seal found at Bishop Wilton,' by the Rev. E. M. Cole, etc.

THE BRITISH WILLOW TIT IN YORKSHIRE.

HARRY B. BOOTH, M.B.O.U.
Shipley.

Being anxious to know if this suggested new British race of Titmouse occurred in the Bradford district, I submitted nine local specimens to Dr. E. Hartert, of the Tring Zoological Museum. Of these, all would have passed muster as ordinary Marsh Tits, but one bird (a male, by dissection), and labelled 'Bolton Abbey, January 3rd, 1908,' was of a much darker rufous colour on the flanks and undersides of the body than the others; but unfortunately, the crown of its head was badly damaged. Dr. Hartert identified this bird as an undoubted British Willow Tit (*Parus atricapillus kleinschmidti*, Hellm.), and the other eight as typical British Marsh Tits.

In 'British Birds' (vol. i., pp. 44-47), the Hon. Walter Rothschild, Ph.D., states the 'principal differences between the Willow Tits and the Marsh Tits are, firstly, that the feathers of the crown and forehead are in the former longer and more loosely constructed, while in the latter they are shorter and more compact. The edges of these feathers in the Marsh Tit are glossy-black, thus causing the whole crown to be glossy and much blacker than that of the Willow Tit, which is of a dull brownish-black or sooty-black; secondly, in the Marsh Tits the tail is almost square, while the Willow Tits have it distinctly graduated. Lastly, also, the notes of the birds are said to be different.'

To an amateur, the most noticable difference between the Bolton Abbey bird and the typical British form of the Mars Tit, is the conspicuously darker rufous colour of the flanks and underparts of the former; but I cannot say if this feature is constant, as I have never examined another example.

There has been considerable controversy amongst British ornithologists as to the validity of this bird as a species (the opponents suggesting that its slight variation may be due to age, sex, or to some other cause), but its adherents stoutly contend that it is the British representative of the North American Willow Tits, and thus that it is quite distinct from, although very similar to the British Marsh Tit.

If the British Willow Tit should eventually be proved to be a distinct species, this record will make an addition to the avifauna of the county.

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* Read at the meeting of the Vertebrate section of the Y.N.U., held at Leeds, on February 15th, 1908, when the bird was exhibited.

THE PROTECTION OF WILD BIRDS IN YORKSHIRE.

The members of the Wild Birds and Eggs Protection Committee of the Yorkshire Naturalists' Union, together with several representatives from the affiliated societies, met at the Leeds Institute on Saturday, February 15th; the Chairman, of the Committee, Mr. W. H. St. Quintin, J.P., presiding.

Mr. Sheppard reported that he had received a cheque for £20 towards the fund from Mr. Charles Milnes Gaskell, which would enable the Committee to carry out its work much more thoroughly.

Cases of the illegal use of pole-traps were reported, and many other matters requiring the attention of the Committee were discussed. Attention was drawn to an appeal recently issued in the press, signed by Mr. St. Quintin and his colleagues on the Watchers' Committee of the Royal Society for the Protection of Birds. In this it was pointed out that ' there are in this country a certain number of collectors who, under the name of British Ornithologists, are amongst the worst enemies with which British ornithology has to reckon, because it is their ceaseless endeavour to obtain "British-taken" eggs and birds. It is a deplorable ambition, and traitorous to the cause of British ornithology; but it exists.'

It was arranged for reliable watchers to be employed at Spurn and other places during the coming year; and special rewards will be given. Hornsea and Bempton are to have special attention. Bills, drawing particular attention to the protection of rare birds (species to be specified), and the illegality of the pole-trap, are to be posted in certain out-of-the-way districts, and rewards offered to those giving information which will lead to the conviction of any persons interfering with the birds sheduled.

The following is a list of subscriptions already promised for the Wild Birds and Eggs Protection for 1908:—

	£	s.	d.
Charles Milnes Gaskell	20	0	0
W. H. St. Quintin	5	0	0
L. Gaunt	2	2	0
Royal Society for Protection of Birds	2	2	0
H. B. Booth	1	1	0

R. Fortune	1	1	0
Oxley Grabham	1	1	0
T. H. Nelson	1	1	0
G. T. Porritt	1	1	0
W. Dennison Roebuck	1	1	0
T. Sheppard	1	1	0
T. Roose	0	10	6
W. Wilson..	0	10	6
York and District Field Naturalists' Society	0	10	6

and in addition there is a small balance (£7 7s. 6d.) left over from last year.

Further contributions will be gladly acknowledged, and should be sent to either of the Secretaries of the Committee (R. Fortune, F.Z.S., Lindisfarne, Harrogate, or T. H. Nelson, M.B.O.U., The Cliffe, Redcar), or to the Editors of this journal.

The Committee meets again in the Board Room, Leeds Institute, Cookridge Street, Leeds, at 3-30 p.m., on Saturday, April 25th, and invites any interested member of the Yorkshire Naturalists' Union to attend.

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A new monthly Natural History Magazine is promised, the first part to be ready on April 1st!

" Answers to Correspondents."—*Primavera.*—No. We think that what you noticed must have been a crocus. It is too early for the cuckoo. —*Punch.*

The Mayor of Hull is endeavouring to arrange for the British Association to visit Hull in 1910. The British Association has only once previously visited Hull, and that was so long ago as 1853.

A Bill was issued recently which provides that 'any person who shall steal, or shall destroy or damage with intent to steal, any plant, root, fruit, flower or vegetable product, having a market value and growing in any cultivated or enclosed land, not being a garden, orchard, pleasure ground, or nursery ground, or in any hedge or bank bounding any such land, shall be deemed guilty of an offence under Section 36 of the Larceny Act, 1861, and shall on conviction thereof be dealt with as provided by that section.' The effect of this is that any labourers or children or others who go into a field and pluck blackberries, or pick up a mushroom, or gather nettles or dandelions; or wanderers on the Yorkshire and Lake District Moors who pick cranberries in the marshes, will be liable to be punished for theft. The Bill has a special clause exempting from punishment any person who, 'being on a highway, shall pick or take any uncultivated fruit, flower, or plant growing in a hedge or bank by the side of such highway.' The whole question apparently rests on the words 'having a market value,' and presumably it will be for the 'officers of the law' to decide which 'plant, root, fruit, flower or vegetable product' has a market value, and which has not. What with wild bird protection 'and one thing and another, a policeman's life is not a happy one.'

FIELD NOTES.

FUNGI.

Correction.—In the list of Fungi found at Horton in Ribblesdale, in 'The Naturalist,' 1907, p. 396, the record of *Coprinus tomentosus* is an error, the species found being *Coprinus fimetarius* var *cinereus.*—THOMAS GIBBS, Wirksworth, January 20th, 1908.

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ARACHNIDA.

***Obisium muscorum* near Middlesbrough.**—Dr. W. J. Fordham and myself took the pseudoscorpion, *Obisium muscorum,* Leach, under a stone on Eston Nab., near Middlesbrough, on January 18th, 1908. The stone was on the open moor among heather, at an elevation of 800 feet. The species has kindly been identified by H. Wallis Kew, Esq.—GEO B. WALSH, Middlesbrough.

***Chiridium museorum* Leach, at Huddersfield.**—The eyeless *Chiridium museorum* Leach, the smallest of the British pseudoscorpions, occurs in various situations: among old books, in old houses, birds' nests, beneath the bark of trees, etc. On February 15th, eleven specimens were obtained from the under-surface of pieces of wood lying in the disused cupboards and on the floor of a tradesman's cellars at Almondbury. A more extended search would no doubt have produced many more. This is not the first time it has been noticed in Yorkshire. Mr. T. Petch observed it in a glass of water at Thorp Garth, Aldborough, in Holderness, some years ago. (*Vide* 'Naturalist,' 1903, p. 460.)

***Diplocephalus beckii* Cb. at Huddersfield.**—In the same cellars both sexes of an uncommon spider, *Diplocephalus beckii* Cb., were met with. It also occurs in other cellars to which I have had access, both at Almondbury and Slaithwaite. Owing to its predilection for such dark retreats and its small size, it may be easily overlooked, and it will probably prove to be more plentiful in Britain than its present records would indicate.—WM. FALCONER, Slaithwaite, 19th February, 1908.

BIRDS.

Ornithological Records for Cheshire and North Wales.—Permit me to record the following :— Fork-tailed Petrel (*Oceanodroma leucorrhoa*), Ellesmereport, near Chester, Dec. 16th, 1907. Red-throated Diver, Corwen, Jan. 7th, 1908. Siskin ♀, Hoole, near Chester, Dec. 15th, 1906. Common Bittern, Stoke, near Chester, Jan. 28th, 1908.—ALFRED NEWSTEAD, Grosvenor Museum, Chester, January 11th, 1908.

Increase of the Marsh Tit in the West Riding.—Almost the feature in the small-bird life of this district during the past winter has been the large numbers of Marsh Tits. I have never known them so common before. The increase was first noticed in early September. At the time I considered it to be merely a chance concourse of wandering flocks ; but they have continued plentiful during the whole of the winter. In conversation with several friends who reside in the outlying districts, I find they have also noted the same thing.—HARRY B. BOOTH, Shipley.

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MOLLUSCA.

Note on the Feeding Habits of *Arion ater*.—The following refers to a specimen of *Arion ater* var. *brunnea* which I kept in confinement. The length of the slug when extended crawling was 5 and 7-16ths inches from the top of the upper tentacle to the end of its tail. Its weight was 284 grains, or a little more than half-an-ounce. When feeding, it took an average of from 20 to 25 bites per minute, and each bite was 1mm. deep, and 5mm. wide. In feeding, it seemed to nip off small pieces, and made a slight snapping sound.

On July 8th, the food (lettuce) which I gave it weighed 1 dram, 11 grains. Twenty-four hours later, on the 9th, the food remaining weighed 25 grains. As evaporation was practically nil, it had eaten 41 grains in the twenty-four hours. During the next twenty-four hours it ate 33 grains, during the next similar period 38 grains, and during the next 44½ grains. On the last occasion, the weather was slightly warmer, which may account for it feeding better. I noticed that it seemed to eat most between the hours of 7 p.m. and 7-30 a.m.

From the above it will be seen that in four days it consumed 156½ grains : consequently in eight days it would eat 28 grains more than its own weight.—W. HARRISON HUTTON, Leeds.

LEPIDOPTERA.

***Aplecta nebulosa* var. *robsoni*.**—While 'sugaring' in the Wakefield district last August, the only insect taken was a very worn female *Aplecta nebulosa*; and from eggs since obtained, the black variety *robsoni* has been bred.—B. Morley.

Curious feeding place of *Tinea pallescentella*.—In June I collected some ejected pellets from under the nest of a Kestrel (which ornitholigists no doubt will be glad to hear reared its young in safety) in North Dene Wood, Halifax, which I put away, and on opening the box about the end of July, I found it to be full of *Tinea pallescentella*, the larvæ of which had been feeding in them. The pellets were all composed of fur.—H. Hope, Ken Cottage, Halifax, February 24th, 1908.

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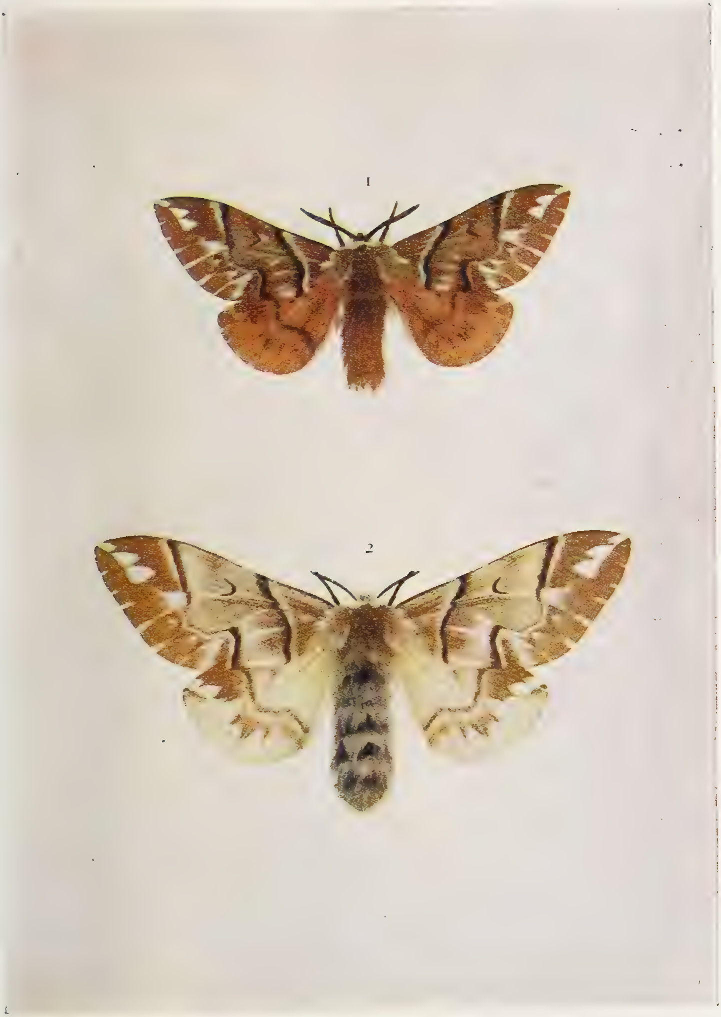
The Moths of the British Isles, by **Richard South, F.E.S.** (Wayside and Woodland Series). F. Warne & Co., 1907. Price 7s. 6d.

This is a 'Companion' book to the same author's 'Butterflies of the British Isles,' which we noticed in this journal in August 1906, and what we wrote about that book refers also largely to the one before us. At the price, it is truly a wonderful production, containing as it does 670 coloured figures of the British moths from the Sphingidæ to the Noctuæ, though this last family is not yet completed; whilst there are in addition, sixty-three plates in black and white, of figures representing the eggs, larvæ, and pupæ. The figures of the moths are by the three-colour process, and we have rarely seen so many coloured figures where so little fault could be found. The very common fault of making the figures too highly coloured and consequently showy is here avoided, and for the most part the merest beginner will be able to determine his or her captures without reference to the descriptions. In some cases, however, only indifferent specimens have apparently been used for copying, which is unfortunate As an instance, the figure of *Agrotis ashworthii* gives no idea of the exquisite colour and shading of the moth when perfectly fresh, and the same may be said of some of the others.

We are, too, greatly surprised that the author should have used the so-called English names only to the plates. There seems to be no reason for this, as even the smallest schoolboy never uses them, and to most—we might safely say all lepidopterists—they will be more 'latin' than the scientific names themselves, for anyone who does not recognize the species at once from the plate, will certainly have to look to the headings of the descriptions to discover what species is intended. As an illustration of the inconvenience of these English names, it may be mentioned that in the book the 'Muslin' moth stands for the two widely separated species *Diaphora mendica* and *Nudaria mundana*.

Notwithstanding these defects, we can honestly give the book the very highest praise, and when the remaining volume is completed, any tyro ought to be in a position to recognize his captures among the macros without the least difficulty. We are kindly permitted to reproduce one of the coloured plates (see plate ix.).—G.T.P.



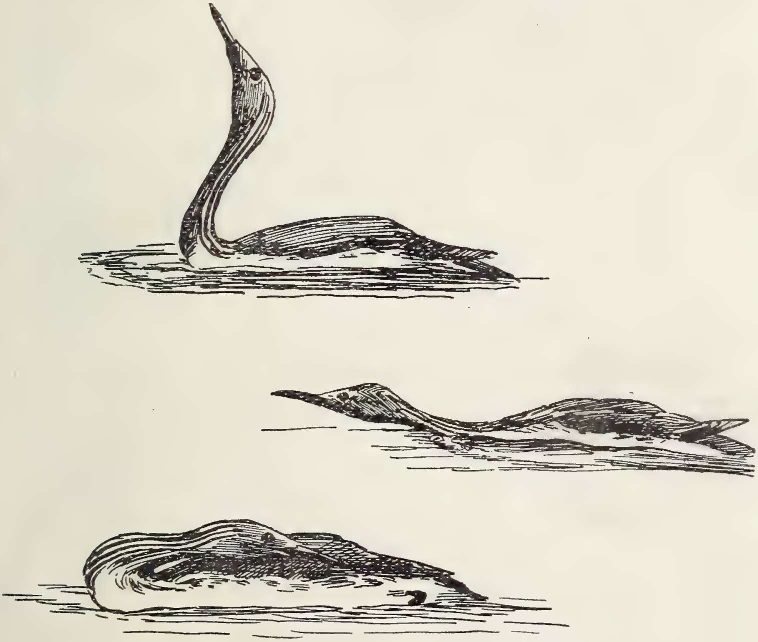
Kentish Glory.
1 *Male;* 2 *Female.*

BRITISH MUSEUM NATURAL HISTORY

REVIEWS AND BOOK NOTICES.

Home-life of Marsh Birds, by **E. L. Turner** and **P. H. Bahr** Witherby & Co., 1907. 62 pp., price 2/6 net.

This is a special photographic number of British Birds, and contains papers by the two authors named above, the first being responsible for "Great Crested Grebes and Coots," "The Water-Rail," "Bearded Tits," and "Three Marsh-Land Warblers." Mr. Bahr writes on "The Snipe," "The Red-Throated Diver," and "A Nesting Colony of Black-Headed Gulls." Several of Miss Turner's photographs, identical with those now reproduced, but on a smaller scale, appeared in our journal for October last, so that our readers will be able to judge of their worth. Others, however, now are published for the first time, and in addition to their scientific value, are excellently reproduced and make good 'pictures.' Mr. Bahr's notes are illustrated by a few sketches in the text, three of which the publishers enable us to reproduce. They shew the curious attitudes assumed by red-throated divers in the presence of the camera.



Red-throated Diver, showing 'outward and visible signs of uneasiness.'

T'Heft an' Blades o' Shevvield, by **Thomas Winder.** Sheffield Independent Press, Ltd., 1907. 128 pp.

In this volume the author has presented several admirable stories in dialect, many of which have the additional value of being of distinct antiquarian interest. They refer to the "good old days," when "rattening," etc., were in vogue. Some of the stories we are very much tempted to reproduce, did space permit. At the end of the volume are some "Antiquarian Papers," taken from "Harrison's Survey of Sheffield in 1637," and other sources. The book is illustrated with views of old Sheffield, etc.

Wild Bees, Wasps, and Ants, and other stinging insects. By **Edward Saunders, F.R.S.** London: George Routledge & Sons. 144 pp., plates, 3/6.

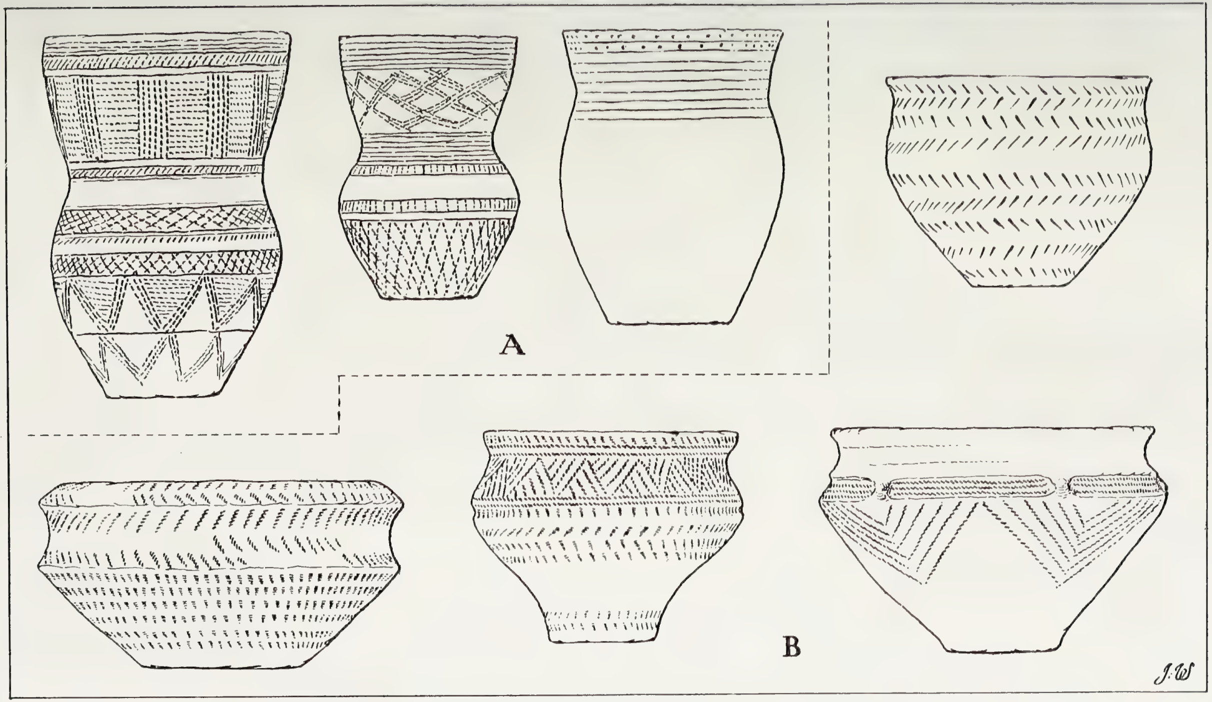
In this little book Mr. Saunders gives a reliable and readily understood account of the Hymenoptera Aculeata. To most people the Hive Bee, Humble Bee, Wasp and Hornet nearly complete the list of these forms. As a matter of fact, however, there are about four hundred different kinds in Britain. In addition to dealing in a very lucid manner with the various groups, Mr. Saunders has chapters on Bees and Pollen-collecting, Bee's tongues and how they suck honey, parasites, ants, their guests and lodgers, the development of Insects from the egg, etc. In addition to several illustrations in the text, there are four very good coloured plates, upon which about thirty species are figured. The book is a useful summary of the subject dealt with, and our only regret is that the author did not deal with this interesting and neglected group more fully.

Gleanings after Time, edited by **G. L. Apperson.** London: Elliot Stock, 1907. Price 6/- net.

In this volume the Editor of the 'Antiquary' has wisely gathered together a number of the more valuable papers which appeared in the earlier volumes of his journal. In the present publication, which we notice may possibly be followed by others, he has reprinted such papers as throw light upon the social and domestic life of the past, a side of archæological study which he truly says 'has always possessed a great fascination for the general reader of the outer circle, as well as for the professed antiquary.' Among the subjects discussed and illustrated are Mediæval Manners and Customs, The History and Development of the Home, The Earliest Industrial Census, Family Life in the 16th and 17th Centuries , Old Farmhouse Plenishings, The Cromwells of America, Funeral Baked Meats, The First Parliament in America, Elizabethan School-boy life, and A Visit to America in 1774. In their present form they are very welcome, and the price of the volume is reasonable.

Memorials of Old Derbyshire, edited by the **Rev. J. C. Cox, LL.D., F.S.A.** London: Bemrose & Sons, Ltd., 1907. 394 pp., 15/- net.

Few counties have recently received more attention at the hands of various writers than has Derbyshire—a fact partly accounted for by the numerous attractions of that beautiful county. In the present volume Dr. Cox has brought together an unusually fine array of interesting papers relative to Derbyshire, the whole being published as one of Bemrose's well-known "Memorials of the Counties of England" Series. The Derbyshire volume is the most substantial so far published. This we might almost have guessed, seeing that Dr. Cox has already issued six large volumes, as well as several smaller papers, bearing on the past history of the county. The book just issued is in no sense a 'history' of the county, but a collection of valuable papers by competent authors. In the chapter devoted to Pre-historic Burials, Mr. John Ward shews that Derbyshire is unusually prolific in almost every form of pre-Roman remains, many being numerous and important. These he describes in a very lucid manner, and there are several suitable illustrations, one of which we are kindly permitted to reproduce (plate xii.). Similarly, probably no county is so rich in pre-historic stone circles, and of these a careful description is given by Mr. W. J. Andrew. Particular reference is made to the fine example at Arbor Low, excellent illustrations of which are given. Dr. Cox himself writes on "Historic Derbyshire," Monuments to the Foljambe family, and Plans of the Peak Forest; and there are articles on Folk-Lore, Rood Screens and Lofts, Swarkeston Bridge, Repton, the old Homes of the County, Wingfield Manor House, Bradshaw and the Bradshawes, Offerton Hall, and Jedediah Strutt. A delightful chapter is that by Sir George R. Sitwell, dealing with Derbyshire life in the Seventeenth Century. In this much information will be found of value to students of that interesting period. The volume is very well illustrated, and there is a fine reproduction of Haddon Hall in colours as frontispiece. There is a good index.



Typical examples of Bronze-Age Burial Vases, Derbyshire.
(A—Drinking Cups; B—Food Vases).

BRITISH MUSEUM NATURAL HISTORY

Bibliography of Anthropology and Folk-Lore, 1906, compiled by **N. W. Thomas.** Royal Anthropological Institue, 3, Hanover Square, 1907. 72 pp., price 2/-

This is the first annual issue of what will eventually become an exceedingly valuable bibliography, provided it appears regularly and promptly. It includes papers, etc., dealing with pre-historic archæology and folklore, and is divided into sections relating to different countries. Part of the ground in this index appears to have been covered by Mr. Bernard Gomme's 'Index of Archæological papers,' issued by Messrs. Constable and Co. At 2s. the price is cheap, and Mr Thomas's bibliography will serve a useful purpose.

The Miner's Geology and Prospector's Guide, by **Geo. A. Corder.** London: E. and F. N. Spon. 237 pp., price 5/- net.

As a frontispiece to this book is a photograph of a burly Englishman, with his trousers turned up to his knees, and staring fixedly at the horizon. Around him are a number of niggers—all, by way of contrast, with eyes watching the little bird coming out of the camera. The picture is called "Author Prospecting in West Africa." The author tells us he has had a varied engineering and mining experience abroad, and apparently to wile away his spare time, he has jotted down in a note-book, various items from well-known geological treatises, or from engineering books, or perhaps, in a few instancse, from original observation. In this way he has gathered together quite a lot of more or less serviceable material, which he has picked over, roughly classified, and issued under the above title. It is a long string of definitions of terms, sometimes appropriate enough in a book of this sort, sometimes accurate. But the astonishing feature of the work is the enormous number of inaccuracies, and these not in any one section, but throughout the volume. There are also some plates 'from drawings by the author.' These are, for the most part, copies from well-known textbook diagrams, badly done, and in some cases made to perform all sorts of wonderful feats. The well-known section at Draughton, near Skipton, is evolved into an extraordinary design. In the definitions we learn that 'Pliocene or Glacial Period—shingle-plains, lignites, vast deposits of bones and excrement of fishes!' The 'Secondary or Mesozoic—Iron ore in Sussex, copper in Algeria and Chili, Bituminous coal in New Zealand,' 'Cretaceous — Iron deposits.' 'Oolitic — copper.' 'Jurassic — coal.' 'Triassic—Rhœtic and Penarth beds, copper, coal.' Again, 'Mollusca Remains—This order of fish [!] constitutes all univalves and bivalve shell-fish, cuttle-fish, octopi, slugs, etc., and forms the chief means of determining the relative ages and order of super-position of strata. All true mollusca have a complete alimentary canal . . . and also respiratory and circulating [!] organs.' There are many similar gems. In the illustrations to fossils, an object resembling a door handle is described as 'Arinculopecten.' 'Secondary bivalves' include Alaria, Acteonina and Nerinæa. Under 'Crinoids' we find Lepidaster and Nummulite. Under 'Ammonites' are Turrelites, Goniatites, etc. The 'Group of strata' is worth framing: 'Cretaceous'—1400 feet, is used for 'agriculture, flints for roads,' and occurs in Kent, Isle of Wight, and Dorsetshire.' The Lias is 800 feet thick, building, alum, jet, and occurs 'York to Dorset.' The Permian is 600 feet, used for the Houses of Parliament! and occurs in Durham. There are also some useful hints for the prospector. For instance, to calculate the strength of ropes: 'C—circumference in in., L = working load in tons, S = breaking strain in tons.

$$\text{Then } C=\left(\sqrt{\frac{L}{k}};\quad L=C^2\times k;\quad S=C^2\times x.\right).$$

We can just imagine the average prospector looking at that! No, the book may be a *Miner's* geology, and it may be a *Prospector's* guide, but whether it will be of any service to 'the mining student, practical miner, the prospector, and explorer,' is another question.

Part IX., forming the first part of Vol. 2, of the **Transactions of the Yorkshire Dialect Society** has been issued. It contains 'Jottings from the leaves of a Dialect Collector's Note Books,' by B. Kirby, and 'Language and Dialect,' by A. Mawer.

The many admirers of the late Howard Saunders, F.R.S., will be pleased to hear that Messrs. Witherby & Co., of 326 High Holborn, W.C., have issued a charming portrait of him, together with a facsimile of his signature. This is suitable for framing, and copies may be obtained from the publishers at 1s. 6d. each.

Our Woodlands, Heaths, and Hedges, by **W. S. Coleman.** Routledge. 1/-, 140 pp. and 6 plates.

As indicated in the sub-title, this excellent little book gives "a popular description of British trees, shrubs, wild fruits, etc., with notices of their insect inhabitants." Often, too, the common fungi occurring on the trees or their dead branches or leaves are given, though the flowering plants peculiarly associated with certain trees are omitted. Common introduced trees are included as well as native species, and their botanical characters given in footnotes. The illustrations, which are numerous, are generally very characteristic, and will be useful in identifying the more important species. In the description of the Butcher's Broom the author speaks of the "flower growing out of the surface of the leaf." It would have been better to have given an account of the true nature of this so-called leaf. The book is readable, well got up, and very cheap at 1s.

The Rendering of Nature in Early Greek Art, by **Emanuel Loewy.** Translated from the German by John Fothergill. Duckworth & Co. 109 pp.

Antiquaries and students of Nature and of Art must alike feel grateful to the translator and publishers for placing Mr. Loewy's interesting book within easy access of English readers. Mr. Fothergill informs us that 'Prof. Loewy's method is unfortunately strange to us. A strict scientific discussion is a tonic much needed by our archæology. Many of our histories, hand-books, and lectures substitute for precision of fact and explanation a deal of superfluous moral comment and æsthetic make-believe.' Whilst we should perhaps hardly have gone so far as that, we are certainly very favourably impressed with the great amount of valuable information which has been compressed within the covers of this small book. Looking at the essay from the point of view of evolution alone, it is admirable. There are no fewer than fifty well-executed plates (twenty more than appeared in the German edition), and in other ways the work has been brought up to date.

Leeds Astronomical Society.—No. 14 of the Leeds Astronomical Society's Journal and Transactions has been issued (published by R. Jackson & Son, Commercial Street, Leeds. 170 pp., price 2/6), and is a record of a year's work of which any astronomical society might be justly proud. It is certainly a matter for surprise to see that a provincial society should accomplish so much. The articles deal with a variety of subjects, including such items as Astronomy in Leeds, Leeds New Observatory Opened, Astronomy and Tennyson (two parts), Natal Time Services, etc., etc. Mr. W. Denison Roebuck has a well illustrated article on Jai Singh and Indian Observatories, the structures shown in the photographs being of an extraordinary character. Mr. Whitmell's articles dealing with Tennyson are exceptionally readable, and indicate that great writer's intimacy with the sciences. The resume of the work of the society contained in the latter portion of the volume is exceedingly creditable. Leeds astronomers and their editor, Mr. C. T. Whitmell, are to be congratulated on the valuable journal, and we would strongly recommend anyone interested in astronomy to obtain it.

A Bibliography of the Dialect Literature of Cumberland and Westmorland, and Lancashire North-of-the-Sands, by **Archibald Sparke.** Titus Wilson, Kendal. 49 pp.

This is a list of more than local interest, and Mr. Sparke has done well to record the various works dealing with the folk lore of this interesting part of the country. One hundred and fifty-eight items are enumerated, and, in addition to appearing in alphabetical order under the names of the authors, are also given chronologically.

Gilbert White of Selborne, by **W. H. Mullens.** London: Witherby & Co. 32 pp., 2/6 net.

This pamphlet refers to Gilbert White, the village of Selborne, and the well-known 'Natural History,' a facsimile of the title-page of the first edition of which is given. There is a good bibliography, especial pains having been taken with regard to the rarer editions. There are seven plates, showing views of the Church, the 'Wakes,' White's tombstone, etc. The pamphlet is well-produced, and at half-a-crown is not particuarly dear.

The Vertebrate Fauna of North Wales, by **H. E. Forrest.** London: Witherby & Co. 538 pp., 17/6 net.

It is a long time since we have had the pleasure of seeing so valuable a record of the natural history of a given area as that contained in Mr. Forrest's volume. During the past seven years, with the assistance of a willing band of workers, a reliable record of the mammals, birds, reptiles, amphibians, and fishes of the northern half of the Principality has been compiled. This, from the thorough way in which it has been done, will be of value for all time, and in view of the fact that much of the area was practically unknown zoologically, the work becomes at once a welcome addition to the serious literature bearing upon the fauna of Britain. This has long been required, and will be most useful for purposes of comparison with other parts of the British Isles. In view of the richness of the material, and the well-defined area, it is a matter for surprise that such a volume was not attempted years ago.

In the account of the mammals, the author includes the evidences of pre-historic species. In this section there is every proof of the thoroughness of Mr. Forrest's methods—folk lore, place names, historical references, and the actual remains of the animals found in caves all being enumerated.

As might be expected, the notes on the birds occupy by far the greater part of the volume, and with these the author is obviously quite at home. In this section there have been, as usual, many more observations and records made, and Mr. Forrest has been fortunate in having several interesting sources of information to assist him. Pennant, who was born in Flintshire, in 1726, is an interesting chapter in himself, and appropriately enough the frontispiece to the volume is a portrait of Pennant and a representation of his residence.

Amongst the amphibians we notice the extremely local Natterjack Toad is present.

Of fishes, a hundred and fifty-nine species are dealt with, this exceptionally large number being due to the sea-border, which explains the presence of a hundred and thirty-two. Amongst these are several interesting records, and one or two which are doubtful. A valuable feature is the bibliography, which seems very complete. Another useful item is the account of the 'Zoologists of North Wales.' This begins with Giraldus, (1147-1218 ?), ends with Stivens, and includes the names of numerous well-known workers. There are several appropriate illustrations, mostly typical breeding haunts of the birds; a good general index, an index of specific scientific names; and a useful map. The printing and paper are also good, though one could have wished for a better cover to the volume In conclusion, we can re-echo the author's wish that a companion volume may soon be produced dealing with South Wales.

Quarterly Record of Additions, No. XXII. **Notes on the more Important Archæological Discoveries in East Yorkshire. A note on a British Chariot Burial at Hunmanby in East Yorkshire.** Being **Hull Museum Publications** Nos. 45, 46, and 47. One penny each. By **T. Sheppard, F.G.S.,** Curator.

To those familiar with previous numbers of these useful and interesting publications it is sufficient to say that these three are in every respect their worthy successors. The second of these is the subject of a paper read before the East Riding Antiquarian Society, by the Curator of the Hull Municipal Museum, the immediate sequel being the passing of a resolution making the Museum the repository of the Society's collection. That such an action is the only possible one to secure the permanent preservation of objects of antiquarian interest is made abundantly evident by the cases the author cites of collections of various kinds, and unique finds which are matters of history, and unfortunately for the present day student, matters of history only. How often in reading of the discoveries in past ages, of articles which to-day would be of transcendent interest we have asked the question the author asks again and again : 'Where are they now ?' Dispersed, lost, forgotten, or destroyed ; we cannot tell. Fortunately for the East Riding at any rate, while regrets for the loss of so many invaluable relics will be none the less keen, the Hull Museum should prove sufficiently powerful to prevent any similar dispersion of East Riding antiquities, provided always that the powers that be are gifted with that civic spirit which, while supremely mindful of their public trust, can appreciate to the full unique opportunities as they present themselves, and rise to the occasion accordingly. In most cases, the provision of accomodation is the one thing needful to secure valuable additions such as are mentioned in these pamphlets, and we should imagine that so long as these objects of general interest, and, because of their unique variety, of great value also, are forthcoming, so long will every effort be made to house them as they deserve. Not the least interesting, because of its varied nature, is the first of these pamphlets. Old Coaching Days, A Mediæval Parish Library, Charles I. Copper coins, Ode to Wilberforce and a German tribute to Hull are some of the subjects to be found in its pages. In these days, when every alleged reformer in this country points to Germany as an example for England to follow, it is refreshing to find that there they are doing the opposite. There is a moral here for those who are not above finding one. The making of a fac-simile chain to attach to a genuine old sixteenth century book by means of its genuine brass loop is a questionably justifiable proceeding. It may be that no harm is done so long as the imitation is carefully distinguished from the real, but there is always a danger after a lapse of time of this vital distinction being forgotten or overlooked to the disadvantage and discredit of the genuine article.—E. G. B.

What Rome was built with, by **Mary W. Porter.** London : Henry Frowde, 1907. 108 pp.

In this well written little book the authoress gives a description of the stones employed in ancient times for the building and decoration of Rome. The fact that she was entrusted with the re-arranging and cataloging of the thousand fine slabs in the Oxford University Museum is evidence of her ability to speak with authority on the subject. About 144 B.C. the mania for rare and costly building material, brought from great distances, began. The craze quickly spread, and the streets of Rome became dangerous by reason of the over-laden carts. Columns of marble measuring six feet in diameter and forty-five feet in length were discovered among ths ruins of Trajan's Temple in 1887. Some blocks of Carrara marble in the pedestal of Trajan's column weigh eighty tons each. Notwithstanding the two thousand years of plunder, havoc, and change, there are at the present day no fewer than nine thousand whole columns of marble remaining in the city. Besides this building material, precious marbles and stones of various sorts were imported. Of these a good account is given, their sources are traced, and their geological structures commented upon.

Nunburnholme: its History and Antiquities, by the **Rev. M. C. F. Morris, B.C.L., M.A.** London: Henry Frowde. 312 pp., 12/6 net.

A volume dealing with Nunburnholme will particularly appeal to our readers from the fact that for many years it was the home of F. O. Morris, well known for his illustrated natural history works, which were printed at Driffield, close by. His son, who is now the rector, has produced the present volume. In his opening sentence the Rev. M. C. F. Morris says, 'Like one of the little "sykes" or rills that issues from the Wold above us, and gives its narrowly contained waters to larger streams beyond our view, the history of a small parish like our own, far removed from the highways of the world, may contribute something to the annals of our country.' And in this very readable and scholarly volume Mr. Morris has given a reliable narrative of 'Brunham,' 'Burnholme,' and later, 'Nunburnholme.' He begins at the beginning, and in the first chapter has a sketch of the geology of the district, and refers to the evidences of its occupation by Briton, Roman, and Angle. The 'Burnholme' settlement is thought to date from the sixth century. The account of the Manor is unusually complete, and in view of the author's interest in the local dialect, that subject is dealt with much more fully than is the general practice in parish histories. The chapters on 'Field names,' a frequently neglected study, is also a very useful one. Others deal with the Church and Benefice, the Nunnery, Elizabethan Nunburnholme, Agricultural Notes, and Birds and Flowers. The last named is rather brief, the portion devoted to the birds being the more interesting. In it mention might have been made of a mallard nesting upon a hay-stack in Nunburnholme, a somewhat unusual site, recorded by the late F. O. Morris. There is a good map of the parish, upon which many interesting features are shewn, including the old pathways across fields. There are ten plates, those shewing the pre-Norman cross-shaft, being of particular interest. Some of the others, being reprodutcions from pencil drawings, are not so clear as they might be. The volume is also worthy of a better cover.

An Almanack for 1908, by **Joseph Whitaker, F.S.A.,** 12 Warwick Lane, Paternoster Row. 1083 pp., 2/6.

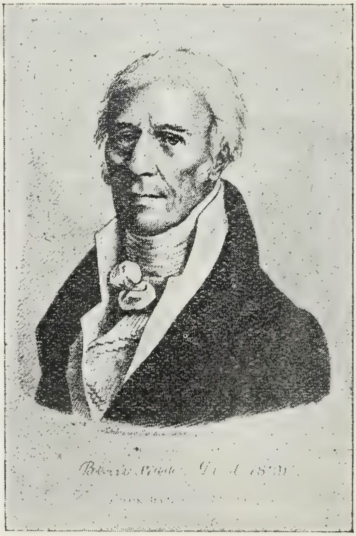
To attempt to refer to the nature of 'Whitaker,' or to its great value, would be superfluous. It is perhaps sufficient to record that the 1908 volume contains many great improvements and additions. Amongst the new articles are a *précis* of the amended Patent Law, a digest of the Employers' Liability Act, an estimate of the strength and cost of the Armies of the World, etc., etc. A rough estimate shews that the index alone contains about five thousand entries. That such a volume can be produced at so low a figure is evidence of its usefulness and popularity.

Seals, by **Walter de Gray Birch.** London: Methuen & Co., 237 pp., 25/- net.

Unfortunately, there is not to-day the same enthusiasm for impressions from seals that existed amongst collectors half a century and more ago. In early Victorian days, it was quite the 'fashion' for the gentry, and those philosophically inclined, to possess long series of impressions from ancient seals, and for those of local interest large prices were paid. It is due to this fact that so many of our provincial museums are now so well equipped in the matter of impressions from seals; and in more than one instance the collections then made contain the only examples now known. To-day, however, perhaps even more than formerly, is the true antiquarian and artistic value of seals appreciated. Amongst the antique gems, such as those illustrated in Mr. De Gray Birch's volume, are examples of the engraver's art, which will hold a permanent position for all time. From ancient Greek and Roman times onward, through mediævel to more modern days, the best work of the artists was most faithfully preserved in the various seals which were then executed. The numerous 'ups and downs,' from an artistic point of view, can be well studied in a carefully selected series of seals. Of course it will be borne in mind that the seal was a matter of much graver importance formerly than now. Then, typewriters and printing presses were unknown, and exceedingly few, even amongst the better classes, could write. A seal therefore was a matter of very great moment, and anyone of importance had his own seal. Each religious house, etc. had also its seal, carefully wrought, and in many cases the beautiful impressions from these have enabled historians to record several important facts which would otherwise have been entirely forgotten. A reliable volume, dealing with seals has long been required by students. Scattered articles and illustrations occur in some numbers, but these are frequently difficult to refer to, and in some cases are misleading. In the work now issued by Messrs. Methuen, in their 'Connoisseur's Library,' artists and antiquaries alike will find all they require. Dr. Birch's name is a guarantee of accuracy. The illustrations, which are given on fifty-three excellent plates, are wonderfully clear, and show the details of the impressions remarkably well. The book is excellently printed with large, clear type, and is a pleasure to peruse.

A Picture Book of Evolution, Part II., by **Dennis Hird**. Watts & Co., 1907. 214 pp., 2/6 net.

This volume is of even greater interest than its predecessor, which was reviewed in these columns for April, 1907 (p. 159). In addition to an introductory chapter, and some 'Preliminary points,' Mr. Hird now deals with 'Comparative Anatomy,' 'Embryology and Rudiments,' 'Pedigree of Man,' and 'The Discovery of Evolution.' The last chapter is particularly interesting, and is illustrated by a fine series of photographs of the most prominent exponents of the doctrine. One of these the publishers kindly permit us to reproduce. There are considerably over two hundred illustrations to this volume.



Lamarck, 1744-1829.

Keighley Borough Museum Report for 1907.

In this three-page leaflet Mr. S. L. Mosley gives an account of a year's work at the Keighley Museum. Specimens and books to the number of 11,015 have been received, and 108 cases of birds, and 26 of butterflies and moths have been sent to the schools. With the Committee's permission, some assistance from the Education Authority, and a spared life, Mr. Mosley during 1908 hopes to place *real* nature study cases in all the schools in the borough where the teachers desire them. He modestly thinks 'the way is open for Keighley to give an object lesson to the country.' Without in any way wishing to minimise the excellent work being done by Mr. Mosley, we can assure him that there are dozens of other museums, some not very far from Keighley, which are doing excellent work in the way they assist the schools. We learn that 'One visit, of greater importance than any other, was that of Prof. Miall,' and the opinion which Prof. Miall gave was: 'Mr. Mosley is working under difficult conditions, having too little time and no trained helper, and I think you should not trouble him with too much advice, but let him alone.' This 'unsolicited testimonial' is printed in Mr. Mosley's report, and we trust his Committee will take the hint. With the report is sent an appeal 'To friends abroad,' in which he asks for 'objects of *any kind* from *any country*.' If this is responded to with anything like enthusiasm, we shall be sorry for the educational side of the Keighley Museum. On the leaflet we observe that Mr. Mosley has the same opinion of the Keighley Museum that every curator has of the Museum under his own charge, viz., that 'it is acknowledged to be one of the best in the provinces.'

Historical Notes of Skelmanthorpe and District, by **F. Lawton.** Published by Paul Dyson, Skelmanthorpe, 36 pp., price 4d.

In this small pamphlet, Mr. Lawton has brought together many curious items relative to the part history of Skelmanthorpe, and it will doubtless be read with pleasure by many Yorkshire Naturalists who have made the acquaintance of the author at the county society's meetings. Amongst the subjects dealt with are 'Trial by Witchcraft,' 'District Militia in 1680,' the famous 'Denby Dale Pies,' 'Skelmanthorpe and the Armada,' etc. A prayer used in Skelmanthorpe against the witches was, 'O Lord God, come with Thy long-tailed besom, and sweep all witches, and wizards, and long-tailed buzzards from this house. Amen.' The only complaint we make about the pamphlet is its shape ($5\frac{1}{4}$ by $6\frac{1}{2}$ inches), and the smallness of the type used.

Highways and Byways in Kent, by **Walter Jerrold,** with illustrations by Hugh Thompson. London: MacMillan & Co., 1907. 448 pp., 6/-

This excellent 'Highways and Byways' series is now well known, and the Kent volume is quite up to the standard of its predecessors. There are many reasons why Kent should be of more than local interest to students of history and others. The author seems to have carefully gathered together and classified the many interesting facts relating to Kent, from Roman to modern times. The number of beautiful illustrations, however, and the way in which they are reproduced, call for special comment. By some clever jugglery of printer's ink, Mr. Hugh Thompson's admirable pencil sketches are reproduced with all the delicate shades and effects of his original lead-pencil sketches. They are certainly the cleverest representations of pencil drawings that we have seen.

Pompeii as an Art City, by **E. v. Mayer.** Siegle Hill & Co., 80 pp., price 1/6 net.

This attractive little volume is one of the well-known Langham series, and contains a well-written account of the art of Pompeii, the finest antique treasure trove of modern times. The author ably deals with the phases of art as exhibited at Pompeii, which can be thoroughly studied nowhere else. Special stress is laid upon the Pompeian art of mural decoration, the influence of dionysian and heroic legends and of Greek history, Pompeian art, etc., etc. The chapter dealing with the evolution of the Pompeian house is a scholarly piece of work, and it should be interesting to a large circle of readers. There are several illustrations, the frontispiece being of a 'Statue of Narkissus,' though the spelling referred to in the text, 'Narcissus,' seems much more familiar.

1908 March 1,

The 14th volume of the **Transactions of the East Riding Antiquarian Society** * worthily maintains the traditions of excellence set by its predecessors. The volume opens with an appreciative notice of the late Lord Liverpool, by whose death the Society has sustained a grievous loss—the descendant of one of the oldest Derbyshire families, many of whose monuments can still be seen in the Churches of Tideswell and Bakewell.

The Rev. E. Maule Cole contributes a short article upon the Roman coins found on the Wolds, and it certainly comes as a surprise that more than 14,000 have been noted within this limited area—a proof, if any were necessary, of the encouragement to trade and commerce given by the Roman occupation. It is sad to think how frequently finds of coins have been thoughtlessly scattered, and much of the valuable historic evidence which a careful scrutiny might have given, has been thereby lost. Of 10,256 coins from the Cowlam find, which were sold to a dealer in London, only 100 units came back again to the North. It is perhaps vain to hope to arouse the 'archæologic spirit' which will see in antiquities a value other than that of the market, but the multiplication of local Museums has already done something to stir up patriotic sentiment, and to secure from destruction a moiety of the relics which turn up from time to time. Articles such as that of Mr. T. Sheppard upon the Archæological discoveries in East Yorkshire do much to help in this direction. By providing a catalogue of the finds in the locality, he has conferred a boon upon all who are interested in pre-historic archæology. Had Hull possessed a Municipal Museum when the Wallis collection was dispersed, and a curator with a tithe of the energy possessed by the present holder of that office, what a magnificent series of antiquities could now be displayed! What would not York give now to obtain the two valuable collections of coins and Roman antiquities offered to the City as a gift in 1743 by Dr. Burton (the prototype of 'Dr. Slop' in 'Tristram Shandy'), when the gift was declined.

Mr. Sheppard rightly draws attention to the important discovery of the pile-dwellings at Ulrome and other spots in Holderness, to which too little attention has hitherto been paid. It is to be hoped that a systematic exploration of these sites will be instituted at some future date. It may be remarked in connection with the human skeletons found in the peat, that the antiquary should follow the Virgilian advice, *nimium ne crede colori*, for bones buried in peat for a century will be as discoloured as those buried for a millenium, and no sound conclusion can be drawn from their colour.

Mr. W. H. Stevenson's article on the place-name Filey is unconvincing, for the greater part is taken up with a consideration of the common terminal—ley, whilst the more important component—Fi—is only guessed at, and the derivation from '*fifel*' is surely too far-fetched for acceptance.

In the notes on Scarborough Castle, Mr. W. Stevenson makes a statement which requires some emendation (page 14). Tutbury, in Staffordshire, did not bear the name Burton in pre-Conquest times. According to Domesday, Henry de Ferrers held the Castle of Toteberie, which stood, however, within the Manor of Burton (*Burtone in qua sedet ejus Castellum*). The town of Burton is five miles distant from Tutbury. Of Tickhill, which is *not* in Derbyshire, but to which was attached the bailiwick of Scarsdale in that County, it is hardly accurate to state that the former name was Dadesley. All that can be said is that under the name *Dadesleia*, Domesday groups the manors and holdings, which in later times were grouped under the name Tickhill.

Miss Eleanor Lloyd's transcript of Yorkshire Subsidy Rolls is a very useful and interesting piece of work. It is hard to imagine anything more likely to alienate the goodwill of the subjects, or to put loyalty to a severer test than this royal method of securing cash euphemistically called 'a loan.' The strength and character of the opposition may be gauged by the names of those who refused payment. The longest article in the volume is that by the Rev. R. C. Wilton, on the Cliffords and Boyles of Londesborough. This includes a valuable description of the opening of the vault, which had not been visited since 1809, with a ground plan, and a transcript of the various coffin plates found there, several of which throw an interesting sidelight upon the history of the family.

Finally, mention should be made of the excellent plates of illustrations. That for instance illustrating the Romano-British fibulæ (plate 3), is extraordinarily clear in the details of the enamels. There is, however, one point in which some improvement might be effected in subsequent volumes. The proof reading appears to have been somewhat faulty and hurried. Thus on page 74, and in the index it is difficult to recognise Hessleskew under the heading Henlesken. 'Hewetson' appears as 'Hewitson' in other places and in the index. Other errors may be mentioned, *e.g.*, 'Achæologia' for 'Archæologia'; but where the substance is so satisfactory, it would be captious to lay further stress upon minor details such as these, which do not materially detract from the genuine value of the volume.

G. A. A.

Mutation in Mosquitoes—discussion and communications: from the Research Laboratory of Samuel Ellsworth Weber, Veterinarian (Lancaster, Pensylvania, 1907).

This is perhaps the most curiously interesting and interestingly curious pamphlet which has come under our notice. If the facts warrant the conclusions which the author puts forward, then it may be said without hesitation that here we have an epoch-making work. So far as we can judge, however, they do nothing of the kind. Briefly put the author claims that because on numerous occasions two differently named adult forms (? species), have resulted from one egg-mass, the different adult forms (? species), being three in number, therefore, 'mutation in animal life is a fact.' And that there should be no possibility of mistake as to his meaning, he defines mutation as 'the production of more than one species, or *genera* (sic.) from the same egg deposition.'

Any entomologist who has had experience in rearing minute species of any order is aware of the difficulties which beset every stage. Assuming, however, that the author was entirely successful in guarding the integrity of each egg mass, it by no means follows that his conclusion is the right one. We should be inclined to say that his results proved the specific identity of three forms hitherto considered distinct, and that henceforth, *Culex restuans*, Theobald, and *C. salinarius*. Coq. must rank as varietal forms of *C. pipiens*, L. It is somewhat surprising that this conclusion did not occur to the author, seeing that he records the rearing of two specimens which were intermediate between the two named forms reared from the same egg-mass. The cause of this confusion of thought and over-hasty assumption appears to be that he has an imperfect conception of what a species really is. When one remembers that amongst the highest developed order of insects, the Coleoptera, there are some genera (*e.g.*, *Cercyon Coccinella*, etc.), which contain species so variable that as many as seventeen different forms of the same species have at one time enjoyed specific rank, it is not difficult to accept the great probability of *three* specifically named forms in an order of much lower development, and but little investigated, being varietal forms of one and the same species.

There is a certain amount of carelessness in the presentation of this pamphlet which we do not like, *e.g.*, the two totally irreconcileable definitions of polygenesis to be found on page 7, and the introduction of parthenogenesis or, as the author terms it, polyembryony, to explain or bolster up his case. The pamphlet appears to us to add one more instance confirming the old advice that the cobbler should stick to his last.—E. G. B.

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* A. Brown & Sons, Hull, price 10/6 net.

Notes on the Earlier History of Barton-on-Humber, by **Robert Brown, Jnr., F.S.A.,** Vol. II., A.D. 1154-1377. London: Elliot Stock, xvi. + 238 pp., price 15/-

A year ago we had the pleasure of drawing attention to the first volume of this work ('Naturalist,' 1907, pp. 122-3). In the present, which we are sorry to find is to be the concluding volume, the history of this ancient township is carried on to the end of the reign of Edward III. A few matters however, referring to subsequent periods, have been included. Personally, we should have liked to have seen a third volume, bringing the history up to say the end of the eighteenth century. That Mr. Brown could produce such a volume we have ample evidence—as it is, we are debarred from having much valuable information about Barton, particularly in reference to that unusually interesting period, the seventeenth century. The present work, however, we notice is the *Earlier* History of Barton, and as such, it is all that can be desired.

In the preface to this volume the author takes the opportunity of briefly replying to the criticims made upon the first volume. He is more than ever convinced that 'a Roman port once existed at Barton, and that many centuries ago, it disappeared beneath the Humber.' Land is certainly being washed away by the Humber at Barton, and a few Roman relics have been found in Barton itself. But whether it was ever a Roman port, it is difficult to prove, as the author admits.

In volume two there are two sections, and six appendices. The first sections refer to Earlier Plantagenet Times, and deal with the House of Gilbert of Gaunt, Ecclesiastical Progress, and the Town and Lordship in the reign of Henry III. The second deals with the House of Beaumont, Ecclesiastical Progress, and the Port and Trade of Barton. Mr. Brown is to be congratulated upon the amount of valuable material he has gathered together relating to a period so often neglected in local histories. His descriptions are also given in a clear style, such as can be read and appreciated by anyone. His explanations of the various place-names, etc., referred to in the old 'charters' are very valuable to students in any part of the country. His account of the two exceptionally interesting Barton churches contains much new material. We certainly agree that the carved heads in St. Peter's Church are probably portraits—that of a woman, at the west end of the south aisle (Fig. 16), being an unuasually fine piece of work. Perhaps the most generally interesting part of the book is that referring to the Port of Barton—its trade, and ferries. In this connection, the once relatively great importance of Barton is dealt with, and formerly, as now, the ferry to and from Hull was a valuable asset to the town. To those in the habit of using the ferry to-day, and are occasionally stuck on a sandbank, or kept for hours in the fog, it is perhaps of some consolation to know that formerly matters were much worse. In 1759, it was 'a sorry and dangerous Passage to Hull, in an open ferry-boat, in which sometimes fifteen horses, ten or twelve cows, intermingled with seventeen or eighteen passengers, were tossed about four hours, more or less, on the Humber, before they can get to the Harbour at Hull.'

Apparantly, Barton people were not always as they should be, and we find records of quarrels with London merchants and others, which sometimes were of a serious nature. There was also a gallows, tumbrill, and pillory for dealing with felons and others.

The appendices are (1) a list of the Chantry Priests connected with the Capella Sancte Marie de Barton, (2) Vicars of Barton-on-Humber appointed subsequently to 1377, (3) Lords and Ladies of the Manor of Barton, (4) Pedigree of the family of Rudston, (5) Some female names used in Lincolnshire in the thirteenth century, and (6) Extract from a paper on Girl names in Lindsey in the olden time. There are three good maps, and several illustrations from photographs shewing details of Church architecture. Mr. Brown has earned our gratitude for making so much valuable material accessible.

Useful Birds of Southern Australia, by **Robert Hall** (306 pp., price 3/6). **A Guide to the Study of Australian Butterflies,** by **W. J. Rainbow** (272 pp., price 3/6). T. C. Lothian, 49 Elizabeth Street, Melbourne.

In these two excellent volumes there is much valuable information relating to two important sections of the fauna of Australia. The book on birds, besides being a reliable account of the avifauna of a part of our colony, indicates at once the great usefulness of the birds to their district, and in this way will probably accomplish much good. From a scientific point of view, the descriptions are clear, accurate, and are illustrated by several photographs of the birds and their nests. The book is divided into six parts, dealing with insect-eating birds, insect and vermin-destroying birds, insect and seed-eating birds, insect and fruit-eating birds, insect, nectar and fruit-eating birds, insectivorous birds and others introduced from the northern hemisphere.

The second volume is an excellent account of the butterflies of the colony, illustrated by a coloured plate, some dozens of other excellent plates, and nearly two-hundred illustrations in the text. The author is the entomologist at the Australian Museum, and consequently is one whose descriptions can be thoroughly relied upon. The book is prefaced by an account of the various phases of the life history of the butterfly, hints on collecting, preserving, rearing, etc.

Final Natural History Essays. by **Graham Renshaw.** Manchester: Sherratt & Hughes, 226 pp., price 6/- net.

This is the third volume of essays issued from the pen of Dr. Renshaw. His 'Natural History Essays' was issued in 1904; his second was "More Natural History Essays.' The present volume is equal to the standard attained by the other two, and contains clear descriptions of many little-known mammals. We are sorry to notice the word 'final' at the heading of the third volume, as these essays are so clearly written, so refreshing and reliable, and the information is so evidently given at first hand from the pen of a well-informed writer, that it is quite a relief to read them, and they form a pleasant contrast to the vast amount of so-called natural history literature which has been accumulating on our desk for some time. The present volume contains sixty essays, and whether viewed from the standpoint of the zoologist or the historian, each one is admirably carried out. Museum curators and collectors of trophies of the chase will find this book very useful from the information it gives. The subjects dealt with are the Drill Baboon, Ring-tailed Lemur, Ocelot Cat, Caracal Lynx, Brown Hyæna, Arctic Fox, Pacific Walrus, European Bison, Cape Buffalo, Musk Ox, Barbary Sheep, Nilgai Antelope, Beisa Antelope, Beatrix Antelope, Leucoryx Antelope, Bubaline Antelope, Blesbok Antelope, Babirusa Hog, Sumatran Rhinoceros, European Beaver, Canadian Porcupine, Spotted Paca, Tasmanian Devil, and the Duck-billed Platypus. There are many plates from photographs, most of which are admirable.

Some Nature Biographies by **J. J. Ward.** London: John Lane, 307 pp., 5/- net. In this book Mr. Ward brings together several articles which originally appeared in various popular monthly magazines. But they are good examples of the way in which natural history can be put in readable form without sacrifice of scientific accuracy. Mr. Ward's method has been to regularly take photographs of changes in natural phenomena. In the case of the bursting of the bud of a chestnut, the photographs are taken daily; a butterfly emerging from its chrysalis is 'taken' every few seconds. But each article is illustrated by a number of well-selected photographs—there being no fewer than two-hundred in all. Butterflies and moths are the author's favourites, but he also deals with 'Coal,' 'Nature's Units,' and 'Jelly-fish.' The twelve plates showing the views of a bridge over a stream, in Warwickshire, one taken each month of the year, are really charming. At a crown the book is very cheap.

Observing and Forecasting the Weather: Meteorology without instruments, by **D. W. Horner.** Witherby & Co., London. 46 pp., 6d. net.

This is an interesting pamphlet relating to the subject referred to in the title. There are also chapters on 'Phenological observations,' 'Weather sayings,' etc. We learn from the title-page that there are 'illustrations from photographs taken by the author.' This presumably refers to the two amateurish attempts of 'Typical Cloud Forms' in the frontispiece, which have been so carelessly trimmed that the horizon seems to be getting on towards the perpendicular.

Adventures in Bird Land, by **Oliver G. Pike.** Religous Tract Society, London. 108 pp.

On the cover of this volume is a representation of a man with a camera hanging down a precipice at, presumably, a height of some thousands of feet. This, we assume, is supposed to represent the author, and it is also typical of the kind of thing to be met with throughout the book. He certainly talks about the birds which he has come across in his various rambles, and here and there are some pieces of information relative to the habits of the various members of the feathered tribe which he has acquired during the past few years. We learn early on that he has changed from a boy who delighted in killing into a keen lover of birds. A little later we are informed that the author writes from experience, as he was as keen a sportsman as it would be possible to find. Further on, an awful experience of photographing birds in a bog and getting nearly lost is given. 'What added to our feelings of discomfort was the discovery of the skeleton of a cow. The creature had reached this spot and evidently found it impossible to return; and the skeleton told us in a terrible manner what our fate would be if we missed our foothold,' and so on, and so on. The illustrations to the volume, of which there are very many, are usually well produced, generally from very good negatives (see plate xiii., which we are permitted to reproduce). They are from the author's own camera, but whether all the birds photographed were living or not at the time, we cannot guarantee. A hundred pen sketches by Mr. E. R. Paton are distributed through the book on the margins, and as tail pieces, etc., and add to its attractiveness. The volume is very cheap.

NORTHERN NEWS.

Mr. R. S. Bagnall writes on 'Some Genera and Species of *Thysanoptera* new to the British Fauna' in the January Entomologist's Monthly Magazine.

Mr. J. Murray, of Carlisle, records that on August 23rd last, *Epinephele tithonus* was flying in hundreds in a lane between Nethertown and St. Bees. Previously this butterfly had been almost unknown in Cumberland (December 'Entomologist's Record).'

The interesting marsupials of Australia will soon be but a memory unless steps are taken to protect them. The Colony of Queensland has moved in this direction by passing a Native Animals Protection Act, which provides a close season for the Native Bear, the Opossum, the Platypus, the Hedgehog, and the Flying Squirrel. The Opossum, formerly the commonest of all the indigenous animals of the Australian 'bush,' is rapidly being exterminated on account of its very valuable fur skin, enormous numbers of which are shipped to this country. It is a common form of occupation in Australia for young fellows to devote themselves to Opossum hunting. It is now proposed in Queensland to protect the native bear all the year round, to prevent the total extinction of this curious animal, which, perched on the top of a gum tree, falls an easy prey to the gunner.

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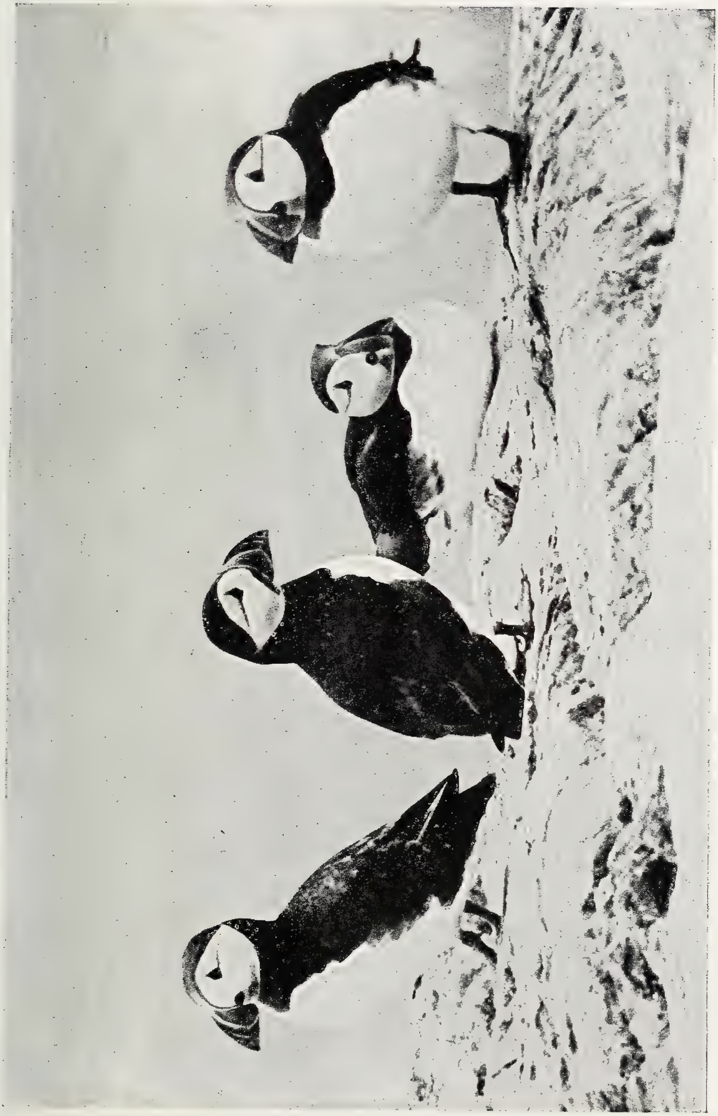

Puffins.

In Bonhote's recently issued 'Birds of Britain,' we notice that the food of a certain species consists of worms, slugs, snails, and *other insects* !'

Mr. W. R. Ogilvie Grant figures and describes 'Two Supposed Hybrids between the Red Grouse and the Ptarmigan,' in 'British Birds' for February.

The editor of a certain natural history weekly is 'afraid that the magazine with the motto "Truth is stranger than fiction" has puplished fictions stranger than truth '—*Et tu Brute !*

In a paper on 'A Revision of some Carboniferous Corals' in the February 'Geological Magazine,' Mr. R. G. Carruthers figures a new variety of *Zaphrentis omaliusi*, under the name *ambigua*. One specimen is from Harrocksford quarry, near Clitheroe.

In the February 'Entomologist' reference is made to the death of one of its referees, Martin Jacoby, and the 'Entomologist's Monthly Magazine' for the same month records the death of Dr. H. G. Knaggs, the last survivor of the founders of that journal.

At a recent sale of natural history specimens from the Middlebrook 'Museum,' London, a great auk's egg realized £110 ; a 'roc's' egg, £36 ; the skull and thigh bones of a mammoth went for £1 4s. ; and a 'remarkable specimen of the red gorilla in a glazed case' fetched 10s.

A proposal emanates from Cambridge to next year celebrate the hundredth anniversary of the birth of Charles Darwin, and the fiftieth anniversary of the publication of 'The Origin of Species.' It is suggested that the celebration be arranged for the week commencing June 20th, 1909.

In some 'Introductory Remarks on the Coal Measures' appearing in the transactions of a prominent geological and mining society, a well-known Professor of Geology informs us that 'The character of the Water was shown in some cases by shells : marine shells indicated the presence of sea water, and fresh-water shells, fresh water.'

In his address to the recent annual meeting of the Entomological Society, the President advocated the establishment of a 'type' Museum, on the lines of an experimental collection now formed at South Kensington, for the purpose of lending specimens to institutions, whereby it was suggested that the existing confusion might be avoided, and the general work of identification made easier.

The North of England Institute of Mining and Mechanical Engineers has just published a 'Subject-Matter Index of Mining, Mechanical and Metallurgical Literature for the year 1902,' (100 pp.), edited by the late secretary, M. W. Brown. This index is carefully done, and deals with the literature of the various countries of the world. We cannot, however, quite understand the reason for the high price of 42/-.

Dr. C. B. Ticehurst, of Guy's Hospital, is investigating the 'Wood Pigeon Diphtheria,' which has been so prevalent and destructive during the past winter. It is suggested that the disease may also be contracted by other birds, especially game-birds. Mr. H. F. Witherby, editor of 'British Birds,' (326 High Holborn, W.C.), would be glad to send schedules to readers of 'The Naturalist' who are willing and able to assist in this enquiry.

On the subject of 'Newspaper Natural History,' Prof. E. Ray Lankester writes to the 'Daily Telegraph':—'The tendency of London newspapers to bedeck themselves every now and again with rank absurdities copied from American rubbish-sheets is a disease. On no subject outside the field of Natural History and Medicine would any editor dream of printing the stuff which does duty as 'news' in regard to these departments—stuff which has not even the semblance of being carefully concocted, but yet is found 'good enough' to cheat the managers of some of the great journals of London.'

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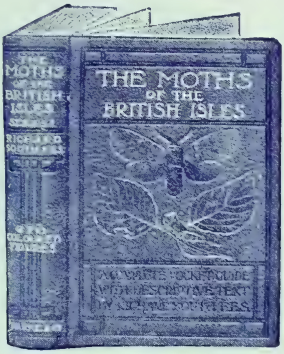

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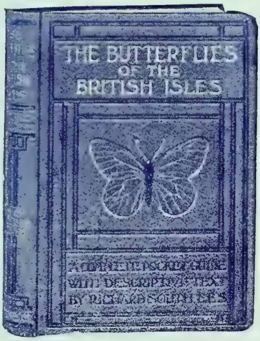

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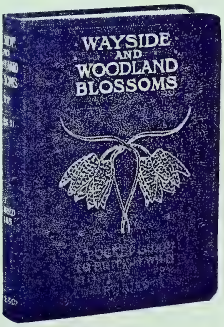

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TECHNICAL COLLEGE, HUDDERSFIELD.

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In Memoriam.

HENRY CLIFTON SORBY, LL.D., F.R.S., F.S.A., F.G.S., etc.

(1826-1908).

One of the greatest losses that Yorkshire naturalists have ever experienced, and one of the severest blows that geological science has ever had, occurred on the evening of March the 9th. On that date Sorby died. Though he was in his eighty-second year, had long been a cripple, and confined to his house, the newspapers of that Tuesday morning early in March contained information which came as a surprise and a shock to hundreds of Yorkshiremen; and scientific men the world over learned with regret that one of their most brilliant lights had been extinguished.

Sorby was in many ways a marvellous man. All his long life was devoted to scientific research; few, if any, have solved as many difficult problems in so many different branches of science as has he. Whatever subject he investigated, he illumined. No problem so profound but was mastered by his perseverance and skill. His investigations were so thorough, his results so far-reaching, that in numerous directions he has very materially benefitted mankind. The indebtedness of the scientific world to him can never be estimated; and yet, with all this, he was the most approachable of men. No one could be more ready or more willing to assist others in their studies than was Sorby. Before the accident occurred which kept him to his house, he never lost an opportunity of encouraging others in their work. He frequently attended the annual meetings of the Yorkshire Naturalists' Union, and any society in his native county, however small, could always depend upon receiving his help. In his quiet and unostentatious way he has done much, not the least valuable part of his work being the delivery of scores of lectures to various natural history societies, the character of which was such that their enormous beneficial influence can hardly be judged.

When the writer last saw him—not so long ago—he was unable to walk; unable even to stand up, and had little hope of ever doing so; yet a more cheerful and more contented man it would have been difficult to have found. His work was still going on, and more hours a day than most 'business' men would care for, was Sorby busily employed. Only a few days before he died he sent notes to two of our scientific journals, and at a recent meeting of the Geological Society of London he had contributed a paper of far-reaching importance which was dealt with at length in our February issue. Until a week before his death he seemed as energetic as ever, but he then had a seizure, the result of which, unfortunately, was fatal.

His funeral took place at Sheffield on Friday, the 13th, and practically every important scientific society throughout the country was represented. In addition to the numerous members of local public bodies, (including the Lord Mayor, the Master Cutler, and the Vice-Chancellor of the University), the following gentlemen attended, as representatives of learned societies :—The Royal Society, Professor H. A. Miers, Professor W. M. Hicks ; the Society of Antiquaries, Mr. E. Kitson Clark, Dr. Walker ; the Geological Society, Professor W. J. Sollas, (President) Professor J. W. Judd, Professor P. F. Kendall, Professor Lapworth ; the Linnean Society, Professor A. Denny ; the Mineralogical Society, Professor H. A. Miers ; the Pharmaceutical Society of Great Britain, Mr. G. T. W. Newsholme ; the Royal Miscroscopical Society, Mr. T. Skelton Cole, Mr. Joseph Gibson ; Sheffield Literary and Philosophical Society, Mr. G. E. Holland, Mr. T. P. Lockwood, Mr. Simeon Snell, Mr. William Parkin, Mr. Arnold T. Watson ; Sheffield Microscopical Society, Mr. John Austen, Mr. Joseph Gibson ; Sheffield Pharmaceutical and Chemical Society, Mr. J. Gilbert Jackson, Mr. J. Austen, Mr. J. F. Eardley ; Yorkshire Geological Society, Mr. Cosmo Johns ; Sheffield Naturalists' Club, Mr. C. Bradshaw ; Yorkshire Naturalists' Union, the Rev. Canon Fowler, Mr. Denison Roebuck and the Hon. Secretary ; Sheffield Society of Engineers and Metallurgists, Mr. F. K. Knowles ; Leeds Geological Association, Professor Kendall.

It must be said that the service was a simple and quiet one.

So recently as 1906 we gave in these pages a full account of Sorby and his work, this being the first of the series dealing with 'Prominent Yorkshire workers."* With it appeared an excellent photograph, and a list of his works up to that time, containing no fewer than 230 references to papers and monographs. Our readers are referred to that article for further particulars relating to Dr. Sorby. Details of the papers which he has written since that list was printed, have already appeared in these pages.—T. S.

---

* May 1906, pp., 137-144; June, pp. 194-197 ; July, 225-230.

PRE-OCCUPIED NAMES.

E. G. BAYFORD,
Barnsley.

Reading through the excellent article on Bibliography, Publication, and Nomenclature (pp. 5-9), I notice the omission of any reference to the important question of pre-occupied names. A short note thereon will not be out of place, and especially as Mr. Sherborn makes use of one to illustrate the law of priority.

It will be obvious that the same generic name cannot be used with propriety for two or more different genera. It will be equally obvious that the number of genera is now so large that the possibility of an author giving to a new genus a name already in use is far from remote. When this happens, the law of priority requires that this name must fall, so far as the newly-created genus is concerned.

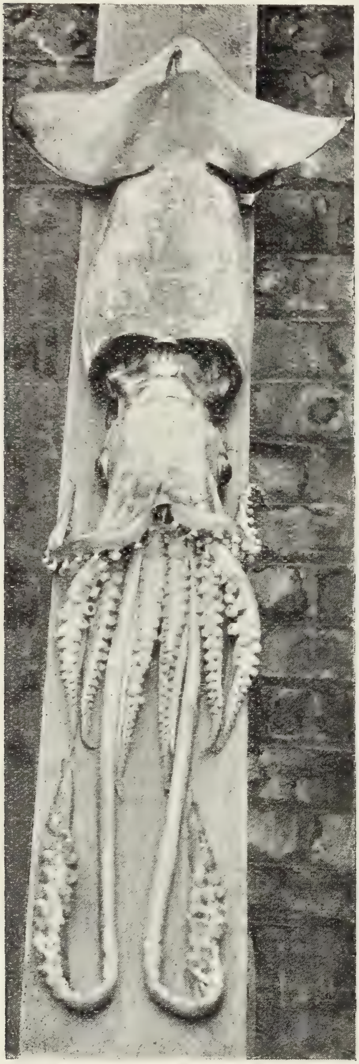
The name *Galerita*, quoted by Mr. Sherborn, is a case in point. First used by Fabricius in 1798 to designate a genus of Carabid Beetles, it was afterwards used by Boie in 1828 to designate a genus of birds of the Lark family. The former must retain it, and the latter must substitute for it the name next in order of priority. I find that Prof. Alfred Newton, in a note on *Galerita* (art. 'Lark,' Encyclopædia Britannica, 1882) says: 'The name, however, is inadmissible owing to its prior use in Entomology.' Notwithstanding this, some distinguished ornithologists persist in using it.

To avoid this and similar difficulties, some authors instead of choosing for a name some existing word, have created words which are anagrams of names already in use, *e.g. Niptus* and *Tipnus* from Ptinus; *Rybaxis* from Bryaxis, etc., etc. Some would ignore these, on the ground that they are not words (*i.e.* having a known meaning), but merely pronounceable combinations of letters. This view, however, has received but little support, and the names quoted have now become well-established. Indeed, there are strong arguments in favour of the practice, *e.g.* the newness of the names is manifest, and their obvious similarity to the names of the allied genera of which they are anagrams is a mnemonic aid to the student.

A LARGE SQUID AT REDCAR.

W. E. HOYLE, D.Sc.,
Manchester.

THE Squid, of which a photograph is here reproduced,* was stranded at Redcar on the 19th of December last. Unfortunately it was allowed to decompose, and was buried before any naturalist had an opportunity of examining it. Through the kindness of Dr. Robinson, however, the remains were exhumed, and a portion of one of the tentacles with most of its suckers intact, the buccal mass with the mandibles, and some fragments of the pen rendered it possible to identify the animal as a specimen of *Sthenoteuthis pteropus* (Steenstrup). This is one of the large oceanic squids, which are never seen on shore except when stranded after death. It has, however, a wide area of distribution, having been recorded from the Atlantic Ocean, from the Scandinavian coast, and from the Mediterranean. Its occurrence on the English coast has been recorded by Goodrich (*Journ. Mar. Biol. Assoc.*, n.s., vol. ii., pp. 314-321, 1892), who describes, with illustrations, a specimen from Salcombe, South Devon, and mentions two others in the British Museum from Scarborough and the North Sea respectively. An example from Ireland is chronicled and figured by Nichols (*Irish Nat.*, vol. xiv., pp. 52-57, 1905). An



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* We are indebted to Dr. Robinson for the photograph.—ED.

instance of the occurrence of another large Squid, *Ommastrephes sagittatus*, on the coast of Scotland has recently been published by Prof. McIntosh, of St. Andrews (*Ann. and Mag., N.H.* (7), vol. xx., pp. 172-175, 1907).

The Scarborough specimen, figured above, measured 5 ft. 10½ ins., with the tentacles extended.

◆

The 'Geological Magazine' for March contains notices of some geologists who have died in 1906, 1907, and 1908 respectively.

To the 'New Phytologist,' vol. VII., No. 1, Dr. F. E. Weiss contributes an interesting paper on the dispersal of fruits and seeds by ants.

Messrs. A. Brown & Sons, Ltd., Hull, have issued an excellent portrait of the late Dr. H. Clifton Sorby, F.R.S. on a large art board, suitable for framing. It is sold at one shilling.

The Malton Naturalists' Society has sent us its 28th Annual Report. We are glad to find that an arrangement has been made whereby the Museum will remain undisturbed until such time as a building worthy of the collections may be erected.

Amongst many interesting papers in the 'Quarterly Journal of the Institute of Commercial Research in the Tropics' (Liverpool University, vol. III., No. 6) we notice two items by Mr. R. Newstead, viz., 'On the Gum-lac Insect of Madagascar,' and 'Scale Insects and Mealy Bugs of Egypt.'

Mr. Thomas Southwell, in his notes on the Arctic Whaling Voyage of 1907 ('Zoologist,' Feb.), shows that the 1907 season was even far more disastrous than the previous year. In all, only three whales were captured, a very small one being secured in Davis Strait, the other two at the Greenland fishery.

We notice from the advertisement columns of a contemporary that the 'largest butterfly farm in England' is in Kent, whereas the 'largest butterfly farm in the British Isles' is near Scarborough. Unless England does not happen to be part of the British Isles there would seem to be a mistake somewhere!

Mr. T. F. Sibly contributes a paper on the 'Faunal Succession in the Carboniferous Limestone of the Midland area (N. Derbyshire and N. Staffordshire)' to the February 'Quarterly Journal of the Geological Society.' In the same publication Prof. A. C. Seward has a well-illustrated monograph on a collection of fossil plants from South Africa.

Some wonderful things have happened in Selby Abbey recently. The most recent find is announced as follows :—'An interesting discovery has been made at Selby Abbey. A stone which had been taken from the north wall of the Latham Chapel, where the full force of the fire did its work, was broken in two, and there, in a small cavity, was found an ordinary bee, alive, but in a comatose state.' This should advertise the Abbey still more.

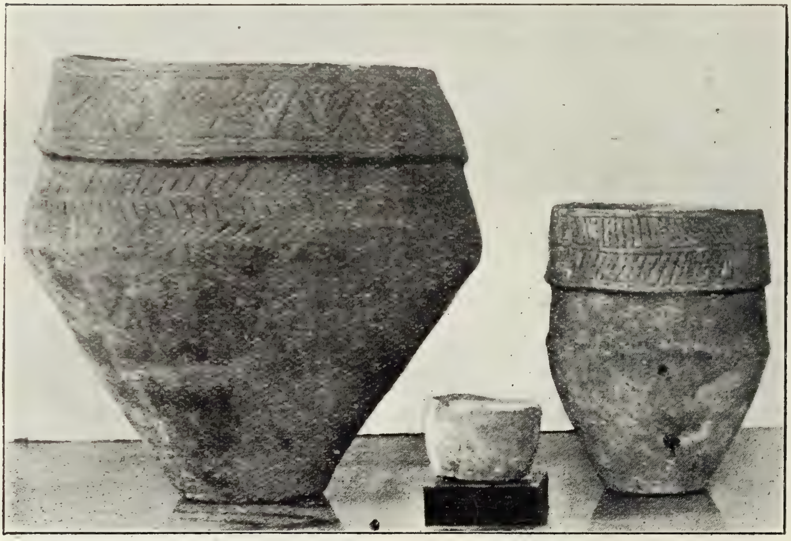
In the 'Annotationes Zoologicæ Japonenses' (Vol. VI., pt. III.), recently received, Dr. Henry A. Pilsbury has an illustrated article on 'Japanese Species of Corbicula.' In this he describes eight species, some of which are new. In his paper he has the following note :—'In dealing with the Chinese species, Pére Hendre has attempted to name every local form, a task I believe to be practically impossible, and if accomplished, the result would be absolutely useless to any other zoologist from the impossibility of again recognising the forms.'

PREHISTORIC REMAINS FROM LINCOLNSHIRE.

T. SHEPPARD, F.G.S., F.S.A.Scot.

THE following notes refer to a number of relics of pre-Roman date from Lincolnshire, which have not as yet been placed on record. Some of the specimens have been found comparatively recently; others have been secured after having been in more or less obscure places for some years. The objects are of the Bronze Age; a few are Neolithic. Palæolithic man does not appear to be represented in the county.

The three vases shown in the accompanying illustration were found in a barrow at Kirton Ings, on the estate of the late George Hunsley, of Kirton Lindsey. They were exposed whilst digging for rabbits, and the two large vessels were slightly damaged, but have since been repaired. The cinerary urns represent cremated burials of the Bronze Age, and are fairly typical in shape and ornamentation. Each contained cremated human bones, and inside the smaller cinerary urn was the small, plain 'incense cup,' shown in the middle of the photograph.



Cinerary Urns and 'Incense Cup' from a tumulus at Kirton Lindsey.

The large cinerary urn is 12½ inches in height, 13 inches wide at the shoulders, 10½ inches across the top, and 4 inches across the base. The lower and greater portion, from the shoulders downwards, is perfectly plain. There is a 'collar,' or projecting part, 2½ inches deep, around the top of the vase, which is ornamented by an impressed zig-zag line dividing the collar into triangles, each of which is filled in with parallel lines. Between the base of the collar and the shoulder are three rows of parallel gashes, which alternate, herring-bone pattern. These appear to have been made by a sharpened implement of wood. On the shoulder is a row of circular depressions, or punctures. These are about a quarter of an inch in diamenter, and about half an inch apart. The upper edge or 'rim' of the vase slopes inwards at an angle of about forty-five degrees.

The second vase is more cylindrical in shape, but at about half its height tapers towards the bottom. It is 7¾ inches in height, is 5¾ inches across the top, 6½ inches wide at the middle, and 3 inches across the base. The collar is 2 inches deep, and ornamented by an impressed herring-bone pattern; the lines, however, vary from being almost perpendicular, to sloping at an angle of nearly forty-five degrees. The remainder of the vase is perfectly plain. As in the case of the previous example, the edge slopes inwards.

The small 'incense cup' was found inside the last vase. It is cheese-shaped, perfectly plain, and is unusually thick. It is 2 inches high, 2¾ inches across the top, and 2½ inches wide at the base. The inside measurements are:—Width, 2¼ inches; depth, 1½ inches. As in the case of the two larger vases, the edge of this small one slopes inward.

The occurrence of these puzzling small vessels in the larger cinerary urns has been noted in other districts.

All three vases were probably interred together, and represent the burials of two people of the Bronze Age.

Bearing upon the cinerary urns of this period, the Hon. John Abercromby has recently published a valuable paper on 'The Relative Chronology of some Cinerary Urn Types of Great Britain and Ireland.'* In this admirable paper the author classifies the various types of cinerary urns, and also enumerates the different forms of implements, etc., found with each kind. The paper is illustrated by no fewer than two hundred process blocks, shewing the types of funeral vases from different parts of Britain. From this memoir we gather that the Kirton Lindsey vases are of what the Hon. J. Abercromby calls the 'Overhanging Rim type.' This he considers was in use in Britain from about 800 or 900 B.C., and probably was in vogue five or six centuries. The type is considered to have died out about 300 B.C., 'a date which seems to synchronise with the first invasions of south and east Yorkshire immigrants of the La Tene period.'

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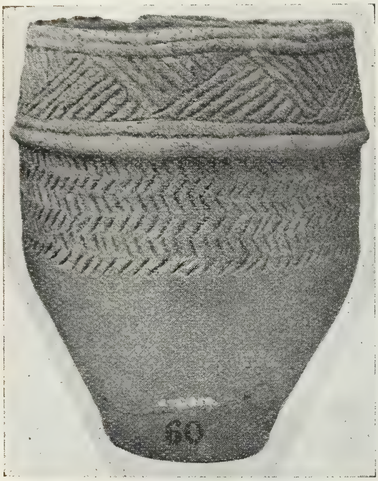
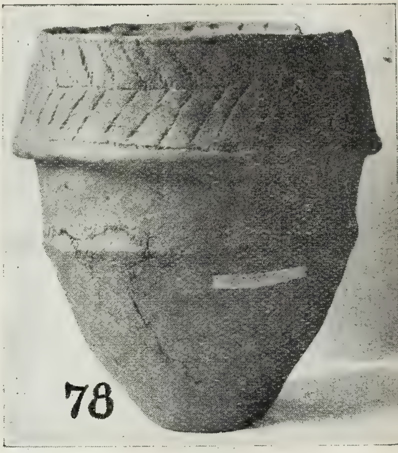
* 'Proc. Soc. of Antiq. of Scotland,' vol. xli., pp. 185-274.



Cinerary Urn from Pickering, Yorks.



Cinerary Urn from Alloa, Clackmannan.

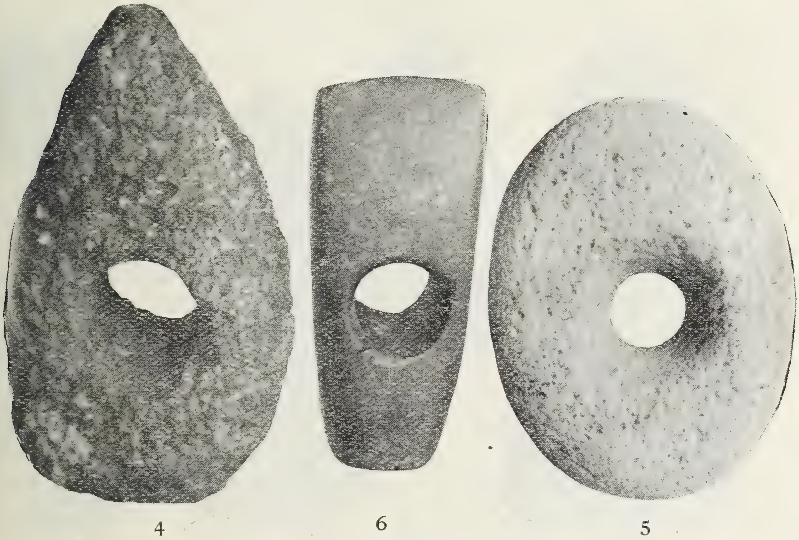
By the courtesy of the author, we are able to reproduce two of his illustrations, which show a remarkable resemblance to the Kirton Lindsey vases. The first (numbered '60') is from Pickering, Yorkshire, and was secured by Thomas Bateman,* whose description reads :—'A small cinerary urn, nine inches high, 6¼ diameter, with a border decorated with vertical lines, the part immediately beneath with rows of small star-like punctures.' The vase is more cylindrical than the larger of the Kirton Lindsey examples, but this may be partly due to its smaller size. The ornamentation, however, (the triangles round the collar, and the herring-bone below, and then the row of 'small star-like punctures') makes the resemblance between the vases very remarkable.

---

* 'Ten Years' Diggings,' 1861, p. 237.

The other example (No. 78) is from Alloa, Clackmannan. It is 12½ inches high, and bears many points of resemblance to the smaller of the Kirton Lindsey cinerary urns. Like it, it has a broad collar, ornamented by a herring-bone design, this being the only ornament on the vase. Others showing similar ornamentation have also been found on the Yorkshire Wolds, and are described by Messrs. Mortimer and Greenwell in their respective volumes.

In addition to the three vases from Kirton Lindsey, we have two fragments of British cinerary urns from the site near South Ferriby, which has yielded such a wealth of Roman remains.* These fragments, which bear the characteristic ornament, together with other specimens, indicate that the spot was occupied by the Britons before the arrival of the Romans.



Stone Weapons from Lincolnshire.

Stone Implements.—The largest is a perforated axe-hammer, made from some igneous rock, which has probably been obtained from the Drift. The felspars have decomposed, leaving the surface covered with irregular pittings, which are also shown within the perforation for the shaft, but not to such a pronounced extent. The specimen was found at Horncastle' and was presented to the Museum by the Rev. J. Conway Walter. It is 6½ inches long, 3½ inches broad, 2¾ inches deep, 2½ inches wide at the hammer end, 3lbs. 9 ozs. in weight, and the diameter of the perforation is 1½ inches (see fig. 4). In Sir John Evans' 'Ancient Stone Implements of Great Britain' (1897, pp. 198-9), is a figure of an almost precisely similar axe head, which was found in draining at Walsgrave-upon-Sowe, near Coventry. Of this Sir John says that it is a rather clumsily made implement 'of greenstone, the surface of which has considerably suffered from weathering.' Apparently the Walsgrave and Horncastle axes are precisely similar as regards size, shape, condition of weathering, etc., so that the illustration in Sir John Evans' book might have stood for the Horncastle specimen.

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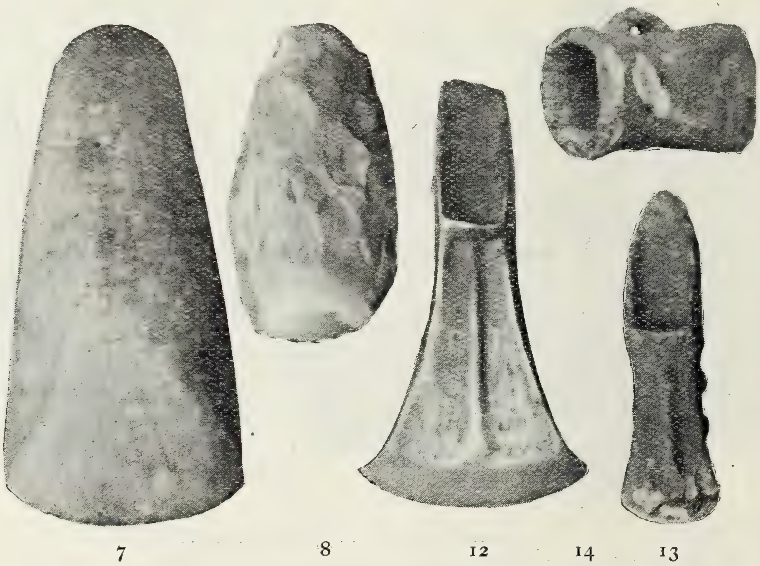
* See T. Sheppard, 'Notes on a Collection of Roman Antiquities from South Ferriby, in North Lincolnshire' (Trans. Hull Scient. and F. Nat. Club, vol. iii., pt. 4, 1906, pp. 247-264. Also Hull Museum Publications Nos. 38 and 39).



Pre-historic Weapons from Lincolnshire (reduced).

Of a somewhat unusual form is a perforated hammer head made from a fine-grained grey igneous rock (fig. 5). It has rounded edges, and the perforation is one inch across in the centre, and widens out towards the edge to as much as 2¼ inches. This specimen appears to be of the type which Sir John Evans alludes to as hammer-heads 'of a simple character, being made from ovoid pebbles, usually of quartzite, by boring shaft-holes through their centres.' The specimen Sir John figures (p. 228) from Redgrave Park is somewhat similar to this specimen.

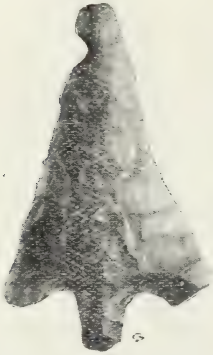
The next specimen (fig. 6) is a perforated adze, the cutting edge being at right angles to the perforation, and it is in all probability a forgery. At the opposite end to the cutting edge the weapon is flattened for use as a hammer. It is made of basalt. There is no specimen like it figured in Sir Sohn Evans' 'Stone Implements.' It has been in the Museum many years, and is labelled as found on the Isle of Axholme. It is 5½ inches in length, 1½ inches deep, the length of the cutting edge is 2¼ inches, width of hammer end 1¼ inches, and diameter of perforation 1¼ inches. It weighs 1 ℔. 4 ozs. It seems to be a piece of 'Flint Jack's' workmanship.

An unusually fine axe head of greenstone, with squared edges, is shown in fig. 7. It is from Barlings, near Lincoln. It is 5¾ inches long, 1¼ inches thick, the length of the cutting edge is 2½ inches, and the axe weighs 14½ ozs. It is made from a fine grained greenish volcanic ash, from which material so many of the East Yorkshire axes have been worked.

Fig. 8 is an illustration of a beautifully-made implement of flint, the outside of which had become weathered before the axe was made. It has a well-sharpened cutting edge, is 3½ inches long, 1⅞ inches wide, and has a depression carefully worked in one side which appears to indicate that it may have been intended for use as a hand implement; the hollow enabling one to obtain a very good grip. I was fortunate to pick it up amongst the chalky gravel forming the upper part of the section in the side of the railway at Donnington-on-Bain, near Louth, in 1897. It resembles very much the polished celt from Santon Downham, Suffolk, figured in Sir John Evans' book already referred to (p. 99).

A rather fine barbed arrow, or spear-point, of flint, is shown in fig. 9. This was found at South Ferriby, on the Humber shore, and is rather more slender in shape than weapons of this kind usually are. It is made of the dark flint obtained from the drift, which is totally different in nature from the flint occurring in the local chalk. The implement is 1¾ inches long, and 1⅛ inches wide across the barbs. Unfortunately, a very small piece is missing from the point and from one of the barbs.

A type of implement found in fair numbers on the chalk wolds of Yorkshire is shown in figs. 10 and 11. These consist of exceedingly hard egg-shaped quartzite pebbles, which have been used for rubbing or burnishing. It is generally thought that they were used for preparing the surfaces of the polished stone axes. Respecting these 'rubbers' Sir John Evans states that 'in grinding and polishing the concave faces of different forms of perforated stone axes, it is probable that stone rubbers were used in conjunction with sand.' Even the smaller flat and rounded faces may have been wrought by similar means. That rubbers of some kind must have been used is, I think, evident from the character of the surfaces, especially of those which are hollowed; and the most readily available material for the formation of such rubbers, was doubtless stone.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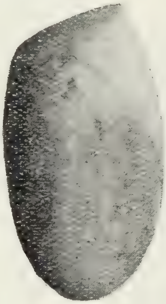
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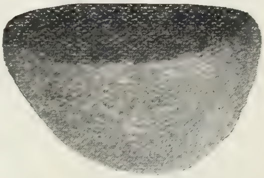
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There is therefore an *a priori* probability of such stone grinding tools having been in use; and if we find specimens which present conditions which such tools would exhibit, we are almost justified in assuming them to have served such purposes. Now in the collection of Messrs. Mortimer, of Driffield, Yorkshire, are several pieces of flint, and portions of pebbles of schist, flint, and quartz found in that neighbourhood, which are ground at one end into a more or less rounded form, and exhibit striæ running along, and not across the rounded surface. They have, in fact, all the appearance of having been used with coarse sand for grinding a concavity in another stone.'

The longer of the two Ferriby specimens is of hard, white quartzite, and one end has been rubbed away and still bears the scratches that have apparently been made upon it by the sand. This is 1½ inches in length. The other specimen is of liver-coloured quartzite, and apparently represents less than half of an ovoid pebble, the remainder having probably been rubbed away. The polished face, which is convex, shows that the stone was used in the direction of its greatest width.

BRONZE IMPLEMENTS.—Of bronze implements we have three examples, two palstaves and one socketed celt. The first, fig. 12, was found some years ago at Barton-on-Humber. It has two cavities for the reception of the split haft, but is without the loop for securing by means of a thong, which appears in the later axes. There is a marked ridge running from the centre of the groove toward the cutting edge. The axe is 5 inches long, the flange is ¾ inch across, and the cutting edge, which is slightly curved, measures 2½ inches in length, and has been hammered out. It weighs 10 ozs. The axe is remarkably similar to a specimen from Sunningwell, near Abingdon, figured in Sir John Evans' 'British Bronze Implements' (1881, p. 80). The measurements, etc. of the Sunningwell axe are exactly the same, but judging from the illustration, the central edge of that example does not extend as far as the cutting edge.

The other palstave (fig. 13) was found on the sandhills near Gainsborough, in 1902, and was presented to the Hull collection by Mr. J. Allanson. This axe has been provided with a loop, but it has been broken away, the connecting points only remaining. The sockets for the reception of the split haft extend to nearly half the length of the axe.

Along the remainder, as in the Barton example, is a prominent medial ridge. The loop, as will be seen from the photograph, was placed quite close to the cutting edge: a somewhat unusual position, as judging from the illustrations in Sir John Evans' work, and from other specimens in our collection, the loop is usually placed midway between the cutting edge and the opposite end of the axe. This axe is 3¾ inches in length, 1⅓ inches at the cutting edge, ¾ inch across the flange, and weighs 5 ozs. The specimen has either been poorly cast and the cutting edge not been subsequently hammered out, or is oxidised and partly broken away. In many respects it resembles the example from Bath, figured on page 89 of Sir John Evans' 'British Bronze Implements.'

The socketed celt (fig. 14), is a later type of implement, and is one of a hoard found at Winteringham, particulars of which occur on a document formerly in the possession of the late George Norman. Upon this were also drawings of the other celts found. This axe was given to me by Miss Norman. It is much oxidised, and apparently devoid of ornamentation. The cutting edge is also slightly damaged. The axe is 2½ inches long, 1⅛ inches wide at the socket, and 1⅝ inches at the cutting edge, and weighs 4 ozs.

The specimens referred to the previous notes are now in the Municipal Museum at Hull.

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Part IX. of **The Birds of the British Isles,** by **Charles Stonham** (Grant Richards, 7/6), has been published, and deals with Harriers, Buzzards, Eagles, Falcons, etc. There are sixteen plates from drawings by Lilian M. Medland.

Gowans' Nature Books, Nos. 17 and **19** (Gowans & Gray, Glasgow, 6d. net each), have been received, and are well up to the standard of these well-known series of pictures of wild life.

The former contains sixty excellent photographs of British Mammals, by Messrs. Oxley Grabham, T. A. Metcalfe, S. H. Smith, and C. Kirk. Mr. Grabham supplies the descriptive letterpress. The latter is the third series of 'Wild Birds at Home,' the photographs being by Mr. C. Kirk, and the notes by G. Girdwood.

Aphorisms and Reflections from the works of T. H. Huxley, selected by Henrietta A. Huxley. MacMillan & Co. 200 pp.

In this handy little volume Mrs. Huxley has gathered together three hundred and eighty-five pithy extracts from the well-known works of her late husband. Huxley's power of graphic description was marvellous, and in the present book we have a fine collection of gems from his writings. Useful indexes are given, and the book is as pleasant a travelling companion as could be wished for.

A Census Catalogue of British Mosses, edited by **Wm. Ingham.** York: Coultas & Volans, 1907, 1/6. 63 pp.

About two years ago the British Moss Exchange Club invited the assistance of bryologists in the preparation of a Moss Census. The response was a hearty one, a strong Committee was formed to carry out the work, and the result is the publication of this useful catalogue. Prof. Barker acted as editor, and brought the work to an advanced state when on his illness and death it was continued and completed by Mr. Ingham. The arrangement adopted is that of Dixon's Handbook, 2nd edition, and while this will not satisfy some, it will on the whole prove most useful. A supplement at the end, however, gives Warnstorf's arrangement of the Sphagna, with an attempt to reconcile it with that of Dixon's Handbook. In the explanatory notes, Mr. Dixon points out the incompleteness of the records, and we agree with him that such a catalogue is the best means of enabling bryologists to fill up the gaps with least loss of time, and pave the way for a more thorough census in the future. The catalogue contains a list of Watsonian counties and vice-counties, and Lloyd-Præger's forty divisions of Ireland, also particulars of the divisions of the larger counties. Opposite each species are given the numbers of those counties for which it is recorded. Eight pages are occupied with lists of sources of records both published and manuscript, also the Herbaria consulted. These will enable workers to decide at once what sources of information have not been utilised. The catalogue is clearly and well printed, and except for an error in date (1892 for 1902 on page 12) and an occasional want of uniformity in the use of the hyphen, the work shows great care in its preparation, and reflects much credit on all concerned in its publication.

THE ICE-BORNE BOULDERS OF YORKSHIRE.

J. H. HOWARTH, J.P., F.G.S.

(*Continued from page 99*).

There have been three directions of source, or at any rate, three principal directions of source.

In his paper on 'A System of Glacial Lakes in the Cleveland Hills,' in the 'Quarterly Journal of the Geological Society,' (vol. lviii.), Professor P. F. Kendall describes these directions as 'Western,' 'Northern,' and 'Eastern.' These terms are accurate, clear, and easily understood, and are adopted here.

THE WESTERN GROUP.

These include rocks from Cumberland and Westmorland, and from the Upper Tees Valley. The rocks recorded herein are very widely distributed in Yorkshire.

The description given by the writer in 'Notes on Boulder Markings,' * may be repeated here, with certain later records also included.

The 'Western' Group rocks range all along the East coast, down into Lincolnshire, and inland from the coast to elevations of over 800 feet, O.D., and to 30 to 120 feet below the surface (Shap Granite) in borings at North Ormesby, near Teesmouth.

They occur spread over the central plain of the Vale of York, from the Tees to Doncaster, Tickhill, and Bawtry; abutting against the Hambleton Hills on the east, and reaching to five miles west of Ripon on the west. They occur also plentifully in the Valley of the Yorkshire Calder, from Todmorden to below Wakefield. They are also in the Valley of the Dearne, but under a certain amount of suspicion as to details, since human agency is known to have at least contributed. They are, however, certainly at Staincross, at the end of the Dearne Valley above Barnsley.

These rocks reached Yorkshire by two principal and widely divergent routes. Those of the east coast and the Vale of York are traceable up the Tees valley to just below Middleton-in-Teesdale, and over the higher pass of Stainmoor (1800 feet), to Brough, in Westmorland; thence to Wastdale Crag (the Shap Granite outcrop), to the Permian area around Penrith, to Eycott Hill and Carrock Fell, in Cumberland; to Threlkeld, St. John's Vale, Armboth and Skiddaw; and to the further areas which produce the Andesites, Ashes, Breccias, and kindred rocks generally described as of the ‘Borrowdale’ type.

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* Proceedings Yorks. Geol. Soc., vol, xv., pt. 1, p. 46.

Those distributed along the east coast appear to have passed out at Tees-mouth, carried by a glacier having free access to the North Sea. Boulders of Shap Granite have been dredged up many miles from the coast.

Later, this free outlet was interrupted by ice advancing across the North Sea in a south-westerly direction, and sweeping down the coast of South Scotland, Northumberland, Durham, and Yorkshire. in such force as to dam back the local glaciers, and to distribute their then terminal moraines along the east coast, mixing them with the Scandinavian rocks which the invading ice carried.

To the foreign ice-sheet the east coast cliffs acted as a buffer, but its south-westerly trend enabled the coast line to deflect it southwards, and the British ice which reached the coast was dragged along with it. Where the coast line was lower, or a river valley emerged, the foreign ice invaded the land for shorter or longer distances as the surface elevation (relative to the pressure of the ice-mass) controlled it, so that in north-east Cleveland it either forced its mass or some of its contents many miles inland, and again at Scarborough and in Holderness.

Indentations in the coastline, protected by cliffs with their curves turned north-eastwards, acted as catchment basins for erratics, so that they are more plentiful in such places as Robin Hood's Bay, Scarborough, Speeton, Gristhorpe, the north side of Flamborough, etc. In such localities they occur in thousands. In many places, the ice topped the cliffs, depositing boulder clays, while in others it failed to do so.

The blocking of the mouth of the Tees compelled the Stainmoor and Teesdale glacier to leave its old course, and to turn down the Vale of York, carrying with it its burden of Lake Country rocks. These are traceable all down the Vale of York as far as Escrick.* They are also found at Doncaster, Tickhill and Bawtry.

A line drawn from about Workington, on the coast of Cumberland, by the southern watershed of Thirlmere, and round to the west side of Wastdale Crag in Westmorland, would appear to mark the boundary line or ‘boulder-shed’ by which the

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* Kendall, Proc. Yorks. Geol. Soc., Vol. XII., part 4, 1893.

Western group of rocks reached Yorkshire. Rocks north of that line travelled to Yorkshire by the Stainmoor and Tees route. There are, however, a few exceptions to this general rule. Eskdale granite, for example, has been recorded north of this line, whereas its general distribution is southward of its outcrop. Similarly Shap granite, the outcrop of which is north of this suggested line, is distributed far to the south-west. These dispersals were probably in the earlier stages, when the local glaciers had free outlets.

It should be remembered that these rocks are everywhere accompanied by others picked up all along the route, and, of course, in the mid and terminal stages, greatly exceeding them in numbers. For instance, the Western group is accompanied by great numbers of boulders of Carboniferous Limestones, Sandstones, Cherts, etc., and the same rule applies to the Northern group, to be mentioned presently, which are accompanied by greywacke sandstones and conglomerates, Magnesian limestone of the Roker type, etc.

THE NORTHERN GROUP.

Rocks from Durham County, the Cheviot area of Northumberland, and Scotland are present in the Yorkshire drift.

These include andesites and porphyrites from the Cheviots, probably both from the English and Scottish side, but the former predominating; the characteristic 'Haggis' rock from the northern edge of the southern uplands of Scotland; red jasper, sanidine trachyte, dolerites and basalts from the southern uplands of Scotland; and Silurian grits from the Valley of the Tweed. There are also records of certain Highland Schists from as far north as the Ochill Hills in Perthshire.

These rocks seem to have been first carried out to sea in south-east Scotland, east Northumberland and Durham, and to have been deflected southwards by the Scandinavian ice-sheet, as the Tees glacier and its contents were.

Porphyrites of the Cheviot type are the most abundant, and are everywhere along the Yorkshire coast, and further south into Cambridgeshire. They are found also in many localities inland, including Barton-on-Humber, about Beverley, at Seamer, at Wykeham, in the Vale of Pickering, in Yedmandale, at Goathland, at Carlton Bank, Bold Venture, Scarth Nick, Thirsk, and Upsal (Hag's Hill). They range from sea-level up to 950 feet, O.D.

The fact that they are found among the highest drift deposits along the northern face of the Cleveland Hills and on the eastern side of the Vale of York, seems to indicate that the Northumberland and Durham local glaciers were, like the Tees glacier, prevented from discharging seawards. They were thus compelled to turn southwards across the Tees, and were forced up the northern slope of the Cleveland Hills by the Scandinavian ice on the one hand, and the Tees glacier (which similarly had to turn southwards down the Vale of York), on the other.

It seems curious that among the very numerous examples of Cheviot rocks, there should be no record of Cheviot granite, beyond one doubtful specimen found at Upsal, near Thirsk. It is just possible, however, that Cheviot granite may, comparitively speaking, have only been recently reached in the process of denudation. The great boss of true granite seems almost complete, and there are still portions left of the rocks which covered it. Possibly the explanation is that Cheviot granite is a bad traveller, and easily disintegrated. Similarly we might expect to find such rocks as Tynemouth dyke. Much, however, remains to be done in the way of microscopical examination of many recorded ' basalts ' and ' dolerites,' and these dyke rocks may very likely be present though unidentified.

THE EASTERN GROUP.

Boulders of Scandinavian origin are found in very great numbers on the shore on the Yorkshire coast, in the clays and gravels forming in places the coastline ; on the top of the coast cliffs at the Peak and Speeton, and at many places inland, both in drift material and on the surface. They range from Saltburn, all along the coast to Redcliff and Ferriby, on the Humber, and in vertical distribution from the sea-shore to 810 feet above sea level. In a gravel pit at Burstwick, in Holderness, they were found 16 feet below the surface.

These rocks are recorded on the coast at Saltburn, Staithes, Whitby, Kettleness, Robin Hood's Bay, Gristhorpe, Filey, Dimlington, and Easington ; inland at Ayton, Seamer, Hutton-Buscel (in the Vale of Pickering), and in Yedmandale, at Garton-on-the-Wolds, and up the Humber Valley ; also at Kirk Moorgate, near Whitby, at 550 feet, O.D. ; at the Peak at 600 ; Danby, at 625 ; Stump Howe, 650 ; on Eastington High Moor, at 700 ; and at West Rigg (in the Lockwood Hills), at 810. These rocks are also recorded in Lincolnshire and Norfolk.

(*To be continued*).

THE STUDY OF FUNGI IN YORKSHIRE.

(Being the Presidential Address delivered to the Yorkshire Naturalists' Union at Halifax, Dec. 14th, 1907).

C. CROSSLAND, F.L.S.

(*Continued from page 96.*)

Becoming connected with the Union through the instrumentality of Mr. West, he acted as cryptogamic secretary in 1881-2. At its first foray, he was one of the principals. The headquarters was at Leeds. The localities investigated were Studley Royal, and Beckwithshaw, Harrogate. Meanwood, Micklefield, and Ledstone Park were also explored. Specimens were exhibited at the evening meeting from nineteen other localities. The assistance of Mr. W. Phillips, Shrewsbury; Rev. J. E. Vize, Montgomeryshire; and Dr. C. B. Plowright, King's Lynn, had been secured. The foray was arranged by W. Denison Roebuck. About fifty of the 318 species exhibited were additions to the county flora. This foray imparted a further stimulus to field mycology. At the next foray held at Selby, October 1884—arranged by W. N. Cheesman, Mr. Massee taking the lead, another substantial addition was made.

Mr. Massee was again at Leeds, 1888, when the woods at Bramham and Harewood were visited. In the meantime he continued his investigations at Scarborough and Bulmer.

In 1890 he was engaged in the Mycological Department, British Museum (Natural History). In 1893, as Principal Assistant (Cryptogams), Kew. When Kew became attached to the Board of Agriculture, he became Vegetable Pathologist to the Board, for diseases caused by fungi. In 1900 he was awarded the Victoria Medal of Honour (V.M.H.), by the Royal Horticultural Society, for research in plant diseases. His most useful book on this subject rapidly reached its third edition, and is of great value to foresters, farmers, nurserymen, and plant growers generally. He has made numerous contributions in the shape of monographs and other articles, to 'Annals of Botany'; 'Jour. Roy. Mic. Soc.'; Linnæan Society; 'Jour. of Botany,' etc. He edited vols. xxi. and xxii. of 'Grevillea.' In addition to these are his 'British Fungus Flora,' four vols.; 'British Gastromycetes'; 'Phycomycetes and Ustilagineæ'; 'European Agaricaceæ'; 'Text-book of Fungi,' etc., and he was joint author of the 'Yorkshire Fungus Flora.' At the Doncaster meeting held 1891, he was the means of establishing an Annual Yorkshire Foray, which is still held in different parts of the county, and to which he remains loyal. He has been absent on only a few occasions. When present, it has been his custom to address the members on some practical side of the subject. He has been President of the Mycological Committee since 1899.

Between 1880 and 1883 Mr. J. A. Wheldon, now of Liverpool, collected and studied the Uredinaceæ near Scarborough, and at Northallerton and Bedale.

Mr. George Lister, a member of the Rastrick and Brighouse Naturalists' Society, though more directly in love with conchology and fossil plants, took an interest in this branch, and collected fungi in Elland Park Wood, and about Ovenden where he resided a few years prior to his death.

We first find mention of Mr. A. Clarke, Huddersfield, as a nature student in 1877. He was then secretary to the Rastrick and Brighouse Society. Since 1882 Mr. Clarke has been the centre of mycological investigations in the Huddersfield district. He was attracted to the subject in the early eighties, and drew round him a few members of the local Societies. He secured the valuable assistance of Worthington G. Smith, a mycologist of extensive experience, in identifying species, and by degrees obtained such a knowledge of the subject as enabled him to give addresses at the various local societies' meetings. In this way considerable enthusiasm was aroused, especially when it became known there were so many esculent species in addition to the ordinary mushroom. The economic aspect caught on, and in no district in the county are edible toadstools better known or more appreciated than they are about Huddersfield.

In season, quantities were taken to the meetings; often the edible species were cooked, and the respective merits of the various kinds discussed. When it became known that a delectable species had been seen in abundance in any particular district, bags and baskets, and on more than one occasion, a horse and trap was hired to bring back the spoils. These were generally distributed, with the result that scores of people obtained, for the time being, this pleasant variation of diet. So well were the features of edible species mastered, that the mistake of cooking a wrong fungus is unknown. Several mycologists have made a beginning by hunting for species for culinary purposes. While seeking these, they have taken interest in others, and have thus developed a real scientific interest—it was so with Clarke. He went thoroughly into the subject, and in 1883 he was able to publish a long list of Huddersfield fungi in the Annual Report of the Huddersfield Botanical Society, which included many species of rare occurrence. A further incentive was given him by visiting the Union forays, and by making the acquaintance of Dr. Cooke and Mr. Massee, whose assistance has always been so generously accorded. Clarke has attended all the Yorkshire forays, with only about one exception, and has been one of the mainstays of the committee. He early developed the highly commendable practice of photographing his finds ; this led to the stereo process being applied to the same purpose, and in this class of picture he was pioneer. His collection of stereo-photos of fungi is perhaps the finest known. They, along with his numerous sketches and coloured drawings, have for years been an attractive feature at our mycological gatherings.

In the photographing of fungi, Mr. Riley Fortune, Harrogate, and Mr. George Parkin of Wakefield are also doing most excellent work.

The edible side of the subject is very ancient, and not to be despised. Bolton refers to several species as being greatly esteemed. He himself was rather suspicious of *Fistulina hepatica*, and writes :—' This is said to be of the esculent kind : I have found it to taste like lamb's flesh, but how far it is to be trusted I know not.' There are seventy or eighty British edible species, most of which are found in Yorkshire, many being very substantial in their build. The popular interest appears to run mostly in this groove, and has been deemed of sufficient importance throughout the country to call forth special popular books on Edible and Poisonous species. Many species have been put to other uses.

In 1885, Geo. Roberts, in his ' Topography and Natural History of Lofthouse,' mentions *Russula virescens*, *Boletus edulis*, and *Helvella crispa*.

Mr. Thomas Hebden, Cullingworth, has long studied the fungi of Goit Stock, Harden, Bingley, etc., and discovered many uncommon species, and quite recently one new to science. —*Clavaria gigaspora*.

The Rev. Hilderic Friend has occasionally recorded species, principally parasitic, from Roche Abbey, Kiveton, Anston Stones, and other places in South Yorkshire.

The year 1888 saw the publication, by the Union, of Dr. F. A. Lee's 'Flora of the West Riding.' A fairly exhaustive work so far at the Phanerogams are concerned. The list of Fungi contains 1009 species for the West Riding. Certainly this is, as Dr. Lees remarks, 'numerically creditable considering the few workers, and compares favourably with lists hitherto published for areas as large as our own, albeit the number is scarcely 25 per cent. of those described as British, but the distribution through the various drainage areas of the known species is still, through lack of resident observers, very far from being worked out.' Lees refers to most of the mycologists we have had under review as contributing to the Fungi.

In 1889, Mr. W. W. Strickland, then of Richmond, Surrey, published a list of 229 species, ('Naturalist,' June and July, 1889). These he collected principally about Boynton; there are a few from Scarborough and Sledmere. The records are all localised, but habitat not always given. They were collected between the years 1874 and 1885: the majority in 1880. The list is introduced by a most interesting dissertation, touching upon the difficulties of the study; the interest to be found in them; the wonderful variety of form; the value of sketching the different parts, including the microscopic features, spores, etc; the probable influence of host or dead matrix upon colour, shape or size, etc. The dried specimens were presented to the British Museum (Natural History). For years he has travelled abroad, but has continued his interest in the Union.

In 1888 the temporary attention of the Rev. C. H. B. Woodd, B.A., was attracted to Fungi by their extreme abundance in the neighbourhood of Oughtershaw, Buckden Woods, and other places in Langstrothdale. During the season he collected and figured about one hundred varieties. Later, the figures were submitted to Mr. Massee, who identified about seventy species. ('Naturalist,' May, 1891).

My own experience with fungi commenced in 1888 at the Bramham and Harewood Foray. Mr. Clarke was my first tutor. The subject appeared to be interesting, but not easy to grasp. During the day, while collecting, it was pointed out by Mr. West, that there was a greater possibility of doing new work in this group than in any other, and that anyone at all interested in botany could not do better than make it a special line. The interest considerably increased when the specimens collected during the day were, in the evening, displayed side by side on the show cases at the Leeds Philosophical Society's Museum. The variety in form and colour was most striking. After that, fungi opened out to me a new world, and though its study proved full of difficulties, constant plodding, in season and out, coupled with friendly assistance and advice, enabled me to conquer some of the obstacles. I take this opportunity of acknowledging generous assistance from both the Kew and British Museum mycologists, also from British and foreign specialists in the different groups.

In 1890 I made the acquaintance of James Needham, an iron moulder, of Hebden Bridge, who proved a good guide in the investigations of that mycologically fruitful district. Having gained a knowledge of the local flowering plants and ferns, he became a diligent collector of fungi, mosses, and hepatics. For years, in the season, I was never left short of fungi to work at ; he could collect as many in half a day as, at first, took me all the following week to get through, the more perishable always receiving first attention. Many species new to science were thus discovered, two or three of which are named after him. Besides these were many new to Britain, all of which may be found in the 'Naturalist,' and in the 'Yorkshire Fungus Flora.' He proved most useful at the Yorkshire Forays, having developed the knack of knowing where to look for specimens, large or small. He compiled the list of plants of the Hebden Bridge district, published in the local guide book.

The present 'British Mycological Society' had its origin at Selby in 1896. It was an offshoot of the Mycological section of the Union. The idea of a National Society had often been discussed by mycologists at various times and places, The matter was again brought forward at the Selby Foray, when it was finally decided to form one. About a score members were at once enrolled ; the name of the Society decided upon ; and the necessary officers elected. These were G. Massee, President ; Carleton Rea, Worcester, Hon. Sec. ; C. Crossland, Treasurer. The objects to be kept in view were—(1) An Annual gathering of a week's duration to be held at a new locality each year, for the investigation of the mycological flora of Great Britain ; (2) The publication of an annual report and *résumé* of work—British and Continental—dealing with mycology for the current year. Sherwood Forest was suggested as a suitable place for the first foray. At that meeting, September, 1897, the number of members had increased to fifty. The 1904 meeting was held at Mulgrave Woods.

Mr. W. A. Thwaites, of Masham, has taken much interest in fungi since the Union excursion held there in August, 1901. He is a carpenter on the estate, and was selected by the head forester, Mr. W. Forbes, as assistant guide. Thwaites was much taken up with these things, so much so, that he continued to forward almost weekly consignments to Halifax during the remainder of the season, with the result that, instead of the fungus records for Masham being nil, as they were at the August meeting, they amounted to 416 at the end of the year. To these, 116 were added the following season. Many further additions have since been made, but time will not allow of more detail ; this can be followed in the 'Naturalist.' Many uncommon species were found—*Venturia Thwaitesii* (Massee and Crossland) being one. Thwaites rarely sent one thing twice over unless more happened to be wanted.

Mr. Thos. Gibbs, Derby, commenced his study of Yorkshire fungi in 1899. He was then residing at Sheffield, and investigated the woods and fields at Wyming Brook, and other places near that city. He has discovered many uncommon species, two new to science, one being known as *Coprinus Gibbsii* (Massee and Crossland). Mr. Gibbs is at present engaged on the fungus flora of Derbyshire.

Mr. R. H. Philip, in addition to his close study of diatoms, desmids, etc., has made many observations on the East Yorkshire Uredinaceæ.

In 1902-3-4, Mr. T. Petch, Hedon, collected and studied Myxomycetes in S.E. Yorkshire, and made numerous additions to the Yorkshire list. He secured the expert assistance of Mr. Arthur Lister, F.R.S., Leytonstone. Mr. Petch worked very diligently at these, in addition to other departments of Natural History, as :—Land and fresh-water mollusca, marine zoology, bird life, etc. The results of his investigations on the Myxomycetes or Mycetozoa, were published in the 'Transactions of the Hull Scientific and Field Naturalist Club.' Mr. Petch is now Government Mycologist at Ceylon.

In 1903, Mr. J. E. Sutcliffe, Bradford, a pupil of Mr. Wests', first found *Plasmopara pusilla* in this country, on *Geranium pratense* at Embsay. Sutcliffe was a promising student, but was obliged to go abroad on account of his health. Other young men are coming forward who may, in time, make an impression on their respective districts.

The work done in Yorkshire, hitherto reviewed, is, with the exception of Soppitt's researches, in the Uredinaceæ mostly systematic. This side of nature study has its place, and always must have, if we are going to keep any sort of order or arrangement in natural history objects. This is everywhere admitted in all branches of natural science. Still, the study of fungi, or any other object, from a biological standpoint, is of much higher importance, and more deeply interesting, than their simple classification. I have never attempted any work in this direction myself, but have always taken a deep interest in the work of those who have, whenever published results have come within my reach, and I look to those possessing the necessary qualifications and equipment, to take it in hand. There are any number of problems awaiting solution.

Immense advance on both morphological and biological lines, in the study of fungi, were made on the Continent by the brothers Tulasne, Dr. Anton de Bary, Dr. Oskar Brefeld, and others, during the third quarter of last century ; and later, in this country, by a disciple of De Barys—Dr. Marshall Ward. Prior to this (in the second quarter of the century), the Rev. M. J. Berkeley—the Prince of British Mycologists—began laying the foundations, and suggesting points in the superstructure of this high-class work in the Ann. Nat. Hist. ; Journal Hort. Soc. ; Gard. Chron. ; etc., and 'secured the great honour of being the founder of the important science known to-day as Vegetable Pathology.'

Mr. Harold Wager, F.R.S., F.L.S., etc., one of the members of the Mycological Committee has, at various times during the last eighteen years, conducted original research work on nuclei, and nuclear-division in fungi. The results have been published, and each article elaborately illustrated in the Annals of Botany. The following is a summary :—

(1). Observations on the structure of the Nuclei in *Peronospora parasitica*, and on their behaviour during the formation of the Oospore. (Ann. Botany, 1889).

[In this paper is announced the discovery that in the Fungi, the nuclei divide by a process of mitosis as in higher plants, and that there is a true sexuality accompanied by the fusion of two nuclei].

(2). On Nuclear Division in the Hymenomycetes. (Ann. Bot., 1893).

[Discovery that nuclear structure and mode of division —Chromosomes and spindle figure—are the same as in the higher plants. The fusion of two nuclei in the basidium is also here described and figured for the first time].

(3). On the presence of Centrospheres in the Fungi. (Ann. Bot., 1894).

[Further observations in Nuclear structure and division with description of division centres which play an important part in nuclear division in some plants].

(4). On the structure and reproduction of *Cystopus candidus*. (Ann. Bot., 1896).

[Contains an account of structure of nuclei, of division and sexual nuclear fusion in this fungus].

(5). The Nucleus of the Yeast plant. (Ann. Bot., 1899).

(6). The Sexuality of the Fungi. (Ann. Bot., 1899).

[An account of the researches on this subject, with a critical review of some explanations put forward by Dangeard and others.]

(7). On the Fertilization of *Peronospora parasitica.*

Papers also on the Life History and Sexuality of *Polyphagus Euglenæ*, have also been read before Section K. of the British Association, and at the Union Fungus Forays.

Mr. Wager has occupied several important posts in connection with the British Association, among them being President of Section K at the South African Meeting. He was for some time President of the Leeds Naturalists' Club; Chairman of the Botanical Section Y.N.U., Examiner in Botany in the University of Cambridge, Victoria (Manchester, Liverpool, Leeds), and Durham. Some time Lecturer in Botany in the Yorkshire College—now Leeds University, etc., etc.

The economic aspect has forced itself upon the attention of Botany professors and others interested. The potato epidemic which broke out in the forties, set investigators on the track of the cause of these destructive plant diseases. The life-histories of many parasitic fungi which prey upon farm, orchard, and garden produce, have since been investigated with a view to reduce their ravages.

Dr. W. G. Smith, Leeds University, informs us that the Agricultural Department connected with the University has carried on experiments in this direction since 1898. Among numerous other investigations and experiments, seed barley has been treated to try and protect the resulting plants from the attack of that nasty disease known as smut. The clover sickness induced by a Discomycetous fungus which considerably reduces the value of the crop, has been studied ; also the potato-scab ; and the cause why potatoes rot when stored in ' pies ' in fields and other places ; and a black mould—*Helminthosporium*—which does much damage to oats and barley. Economic work of this nature is of great practical utility, and growers of field and garden produce ought to take every advantage of the valuable information resulting from such necessary investigations. Dr. Smith is President of the Botanical section of the Union.

Dr. T. W. Woodhead, Biological Department, Huddersfield Technical College, and joint editor of the ' Naturalist,' has made a detailed study of the nodules found on alder roots, also of the organism which produces them, known as *Schinzia alni* ; the life history of this organism was traced through its successive stages within the tissues of the nodule. Dr. Woodhead has done much original work in the Ecology of woodland, and other vegetation in several districts, and is at present Chairman of the Botanical Survey Committee of the Union.

The latest development in the Mycological Committee has been to apportion the work, and make certain individuals responsible for certain groups. This will facilitate the investigations both throughout the year, and at the annual forays. The present Committee consists of :—G. Massee, Kew, President ; C. Crossland, Secretary, Halifax ; Rev. Canon Fowler, Liversedge ; Harold Wager, Leeds ; A. Clarke, Huddersfield ; W. N. Cheesman, Selby ; Thos. Gibbs, Derby ; C. H. Broadhead, Wooldale ; J. W. H. Johnson, Thornhill ; R. H. Philip, Hull ; and H. C. Hawley, Boston, Lincs.

Annual forays have been held in various parts of the county since 1891. Each successive meeting, coupled with individual effort through the year, has added to the stock of information. Constant additions have been made to the county flora. It would be tedious to give the particulars of each year's work, though such a table would be interesting. Let it be sufficient to say that during the last twenty years the number of known Yorkshire fungi has been more than doubled, and the knowledge of their distribution considerably increased ; and that, within this period, twenty-nine species new to science, and sixty-five new to Britain have been discovered in the county. The results of the investigations up to 1905 are included in the 'Yorks. Fungus Flora' and Appendix.

A desire for more information about these plants, by Naturalist Societies generally, is increasing. The Union members at the ordinary excursions have, during the last few years, displayed a deeper interest in the subject than ever before. Several have forwarded specimens from their own districts among whom may be mentioned Mr. Bunker, Goole; Dr. Corbett, Doncaster; Rev. F. H. Woods, Bainton; Mr. P. F. Lee, Dewsbury; and Mr. W. P. Winter, Bradford.

Seeing that wide areas are yet uninvestigated, and that others have only been casually visited, the probabilities are, if the subject continues to be diligently pursued, numerous further additions will certainly be made.

An up-to-date systematic text-book, dealing with British Pyrenomycetes is much needed. We are a long way behind other countries in this respect.

While the 'Naturalist' has been my chief mine in compiling the above, I have derived much information from other sources as Bolton's 'Halifax Fungusses'; Grevillea; Journal of Botany; Annals of Botany; and other works, a full bibliography of which would be too lenghty to quote. In addition, each and all, now living, who have at any time taken interest in Yorkshire fungi, have cheerfully sent me all the information they possessed suitable for my purpose. I have also been indebted to the following, to whom I tender my sincere thanks for consulting various works:—Messrs. B. Daydon Jackson, Secretary Linnean Society; G. Massee, and A. D. Cotton, Kew; A. Gepp, British Museum (Natural History); and W. Denison Roebuck. Britten and Boulger's 'British and Irish Botanists' has proved very useful.

Every care has been taken not to overlook any fact that would tend to make the history more complete; if any such has been omitted, I shall consider it a favour to be advised.

◆

At the recent Anniversary Meeting of the Geological Society, Prof. W. J. Sollas was elected President.

Our congratulations to the Rev. Canon Greenwell, F.R.S., F.S.A., etc., who celebrated his eighty-eighth birthday on March 23rd last.

'For Sale a collection of Birds' Eggs, including Crocodile's, Alligator's, and several specimens of Tortoise eggs.'—'Let me sell you a cow on the instalment system.—Advertisements in a 'Natural History' Journal.

FIELD NOTES.

ENTOMOLOGY.

An Addition to the List of Yorkshire Diptera.—The splendid list of additions to the Yorkshire list as published in the 'Victoria County History,' contributed at pages 104–106 by Mr. Ashworth, reminds me that in the collection of the insects of Doncaster and district made by Dr. Corbett, are several examples of *Stenepteryx hirundinis*, not hitherto recorded from the county, as well as specimens of *Ornithomyia avicularia*, hitherto recorded only from the Barnsley district. There is every reason to believe that both these species of the family Hippoboscidæ are more common, and much more widely distributed than would seem from these meagre records.—E. G. Bayford, Barnsley.

—:o:—

FUNGI.

***Hydnum auriscalpium* in Lincs.**—On the 16th of March, Mr. R. W. Goulding, Librarian, Welbeck Abbey, sent me a fungus for identification, which proved to be *Hydnum auriscalpium*, Linn. It is not in the list of fungi in 'The Flora of West Yorkshire,' but in Mr. Crossland's 'Fungus Flora of the Parish of Halifax' the following note occurs with regard to it: 'Under fir tree in plantation about Halifax, in September and October, Bolton, Table 90, on fir cones.' From this I conclude that it has not been observed *lately* there, nor in the West Riding. On communicating again with Mr. Goulding, he sends me the following very interesting letter: 'I dare say you know the name of John Lightfoot, author of "The Flora Scotica"; he was chaplain and librarian to Margaret, Duchess of Portland, and helped Her Grace to identify fungi. In one of his letters to her he writes: "The *Hydnum* growing out of the fir-cones pleased me most exceedingly. It was never known to be an English species till your Grace discovered it to be so. It is the *Hydnum auriscalpium* of Linnæus."' 'Isn't it odd,' adds Mr. Goulding, 'that I should have sent you the same thing 140 years later?' I can well imagine that this small fungus, with its hairy, kidney-shaped pileus, purplish spines, darkest at their tips, slender stem, rooting in the fir-cones and tomentose, 'took the fancy' of both John Lightfoot and Her Grace. It is only about half-an-inch across, so would elude the notice of any but those who are possessed of the "toadstool eye!"'—W. Fowler, Liversedge.

GEOLOGY.

Shells from Holderness Gravels.—In addition to the list of shells from the gravels of Kelsey Hill, mentioned by Messrs. T. Sheppard, F.G.S. and J. W. Stather, F.G.S. in 'Note on a new section in the Glacial Drift of Holderness' ('Proceed. Yorks. Geol. Soc.', Vol. XVI., Part 2, 1907) I have obtained the following:—*Boreotrophon clathratum,* L., *Epheria divaricata,* Fab. *Retusa obtusa,* Montague, *Natica lactea,* Goulding, *Cyclocardia borealis,* Conrad; *Turbella parva,* Da Costa.—George Sheppard, Hull.

—: o :—

BIRDS.

The Bittern near Harrogate.—A strange bird, which proved to be a Common Bittern, had been seen in the neighbourhood of Bishop Monkton for some days during the month of January. My informant, a keeper, had seen it several times, but had not shot it *because he thought it was a rare bird.* However, on the 20th it was captured by a boy who took it alive. It only lived a day in captivity, the probability being that it had been injured in some way.—R. Fortune, Harrogate.

—: o :—

CORRESPONDENCE.

The Dating of Societies' Transactions.

To the Editors of 'The Naturalist.'

Dear Sirs,

With regard to the criticism as to the date appearing on the cover of vol. XVI., part 2, of the 'Proceedings of the Yorkshire Geological Society' (see 'The Naturalist,' No. 614, p. 68), allow me to state that however 'extremely improbable' it may seem to you, 1907 *is* a correct one for this part, inasmuch as it contains the proceedings of the society for that year.

May I also be allowed to say that although the number was not issued until the second week of 1908, I fail to see how any grievance which an author might have would be lessened, or how the cause of priority would be served by attaching the date 1908 to papers actually read in 1907.

Yours etc.,

Arthur R. Dwerryhouse,
Hon. Editor, Yorks Geol. Soc.

Leeds, 17th March, 1908.

REVIEWS AND BOOK NOTICES.

The Birmingham and Midland Institute Scientific Society has issued the 'Records of Meteorological Observations taken at the Observatory, Edgbaston, 1907,' by Mr. Alfred Cresswell, at two shillings.

'One and All' Gardening for 1908 (Agricultural and Horticultural Association, Ltd., 92 Long Acre, W.C., 2d.) has been received, and is a wonderful twopennyworth. It contains 160 pages of useful matter to gardeners and others, and is profusely illustrated. We are informed that 100,000 copies have been printed.

Wee Tim'rous Beasties, by **Douglas English** (3rd edition). Cassell & Co., 223 pp., 5/- net.

We reviewed the first edition of this book in our journal for May 1904, and the fact that it has now reached a third edition confirms the good opinion we then expressed respecting it. It is now printed on thicker paper, and makes a most suitable volume for young readers. There are one hundred and fifty illustrations from photographs, mostly of the smaller mammals.

Quarterly Record of Additions, No. XXIII. **Hull Museums:** Annual Report for 1907. Being Hull Museum Publications 49 and 50.

The first of these contains an extremely valuable and interesting account of the Patrington Sun Dial, wrongly described by Poulson as an Anglo-Saxo-Roman altar. We are glad to find that this splendid specimen of seventeenth century dialling has been secured for the Hull Museum, thus ensuring its permanent preservation.

The second one is sufficiently described by its title. The record of the work done during the past year shows that considerable activity has been displayed in almost every branch of Natural History, Geology, and Archæology, and reflects the highest credit on all concerned. We are particularly pleased to note that No. 48, shortly to be published, will be an index to the forty-seven numbers which have preceded it. Their value will thus be enhanced, and the many interesting facts they contain rendered more easily accessible.—E. G. B.

Nature Round the Home, by **Patten Wilson.** Longmans, Green & Co. 243 pp.

The writer sets out by saying in his preface: 'In writing this book, my dears, it is my earnest wish to encourage in you all a love of natural history.' On opening the book we notice a full-page picture of a huntsman, and further on, a gamekeeper with his gun. In the letterpress one finds 'love' of very amazing a character. How such an author can label himself 'A lover of nature' is more than we can fathom. Here are a few extracts:—*Page* 55—'So I shot Mr. Mouse and several of his family with an air gun, as they crept along the curtain pole.' *Page* 60—'Arthur and John take the ferrets from the little bags, and put them in the rat holes.' *Page* 166—'Chapter on "Starlings" (1) 'He blew off both barrels of his gun at them, &c.' . . . (2) 'Splitting their tongues with a silver coin to make them talk.' The reader is advised 'not to try it,' because it is 'nonsense'—not a word about its heathenish cruelty. (3) 'Starlings are very good to eat when young, when cooked in a pie. I think I must have a few.' We observe that Mr. Patten Wilson's feelings—what he has of them—reside in his *lower bosom.*' *Page* 161—'When you are old enough, you will use a small bore Colt rifle for rook shooting, with a bullet about this size!' (Here follows a full-size sketch of a bullet). *Page* 174—'Shooters do not shoot him as he is walking, because that would be too easy.' And now a word of thanks to Patten Wilson for writing his little book too late for *my* sons to be warped by its teaching.—D. W. Bevan.

NORTHERN NEWS.

Amongst the recently elected Fellows of the Royal Society we notice the names of Mr. J. Stanley Gardener and Mr. C. J. Forsyth Major.

Amongst the 'Country Side Hints' given in a weekly newspaper, we notice the reader is instructed how 'to stalk a *weary* bird'! The '*bull* of concussion' on flint flakes is also referred to in the same publication.

In answer to numerous enquiries: there is no mistake with regard to Plate XI. (Woodcock on Nest) in our March issue. The bird is in the centre of the picture, and a line drawn from the top left-hand corner to the bottom right-hand corner of the plate would cut through its eye, and along its bill.

We have received the four parts of the Journal of the Northamptonshire Natural History Society and Field Club for 1907. The publication contains many useful contributions to the natural history, geology, and archæology of Northamptonshire and Leicestershire. We notice that 'the rare shell of *Baile Perversa*' [*sic*], is recorded from Ecton.

At the recent annual meeting of the York Philosophical Society, Dr. Solloway was appointed joint curator of Archælogy; and the Rev. W. Johnson was appointed Hon. curator of Geology in the place of the late J. F. Walker. Dr. Tempest Anderson was re-elected president, Mr. Edwin Grey, hon. treasurer, and Dr. Tempest Anderson and Mr. C. E. Elmhirst, hon. secretaries.

Amongst the valuable leaflets distributed free by the Board of Agriculture and Fisheries, three have just been received, dealing with the American Gooseberry Mildew, the Frit Fly, and the Pine Disease. The first refers to a disease which is likely to spread rapidly in this country, and seriously interfere with the crops. These pamphlets can be obtained free of charge on application to the Secretary of the Board, 4 Whitehall Place, London, S.W.

In the recently issued 'Memoirs and Proceedings of the Manchester Literary and Philosophical Society' (Vol. LII., pt. I.), Mr. D. M. S. Watson has two interesting notes dealing with Palæobotany. The first refers to a cone of *Bothrodendron mundum* (Will.), and describes a specimen in the Halifax hard bed. His second note is on the 'Ulodendroid scar,' which is found on the stems of certain species of coal plants. Both papers are illustrated by excellent photographs.

We have received the recorders' reports for 1907 of the Bradford Natural History and Microscopical Society. There are some useful lists of additions to the flora and fauna of the Society's district. The notes are as under:—Cryptogamic Botany, M. Malone; Phanerogamic Botany, J. Beanland; Entomology, J. W. Carter; Diptera, J. H. Ashworth; Hymenoptera (first list of species), R. Butterfield; Conchology, F. Rhodes; Vertebrate Zoology, H. B. Booth; and Geology, J. H. Ashworth. We notice that one mammal and four birds have been added to the local list. The membership of the Society is now ninety-six.

A meeting of the Vertebrate section of the Yorkshire Naturalists' Union was held at Leeds on Saturday, the 15th February. Mr. St. Quintin showed some wonderful living leaf insects which he had reared; also some eggs of the Waxwing, laid by birds in his aviaries. Mr. H. B. Booth showed the Marsh and Willow Tits, referred to elsewhere in these pages, and a lot of photographs and lantern slides were exhibited by Messrs. S. H. Smith, W. Denison Roebuck, H. B. Booth, and R. Fortune. Mr. Roebuck handed round some fine carvings of Antelopes, etc., executed by natives of Africa. It was decided to hold future meetings of this section. The meeting was in every way a thorough success, and the plan might be commended to other sections and committees of the Union.

4 APR. 1908

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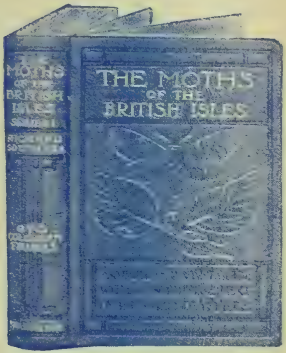

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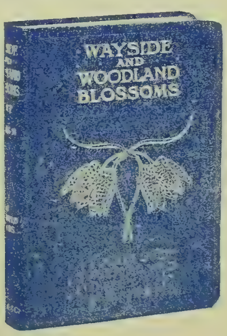

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THE BIRDS OF YORKSHIRE. By T. H. NELSON, M.B.O.U., WILLIAM EAGLE CLARKE, F.L. M.B.O.U., and F. BOYES. Also being published (by Subscription, **One Guinea**).

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LIST OF YORKSHIRE COLEOPTERA. By REV. W. C. HEY, M.A.

THE NATURALIST. A Monthly Illustrated Journal of Natural History for the North of England. Edit by T. SHEPPARD, F.G.S., Museum, Hull; and T. W. WOODHEAD, F.L.S., Technical Colle Huddersfield; with the assistance as referees in Special Departments of J. GILBERT BAKER, F.R. F.L.S., PROF. PERCY F. KENDALL, M.Sc., F.G.S., T. H. NELSON, M.B.O.U., GEO. T. PORRIT F.L.S., F.E.S., JOHN W. TAYLOR, and WILLIAM WEST, F.L.S. (Annual Subscription, payal in advance, **6/6** post free).

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All communications should be addressed to the Hon. Secretary,
T. SHEPPARD, F.G.S., The Museum, Hull.

NOTES AND COMMENTS.

POSTAGE OF SCIENTIFIC LITERATURE.

On the 12th of March, an influential deputation from the British Science Guild, which consisted of representatives from most of the important Societies in the country, waited upon the Postmaster-General for the purpose of asking for a reduction in the rate of postage on the publications of Scientific and Learned Societies. The deputation was introduced by Mr. F. Verney, M.P., who stated that there was 'a practically unanimous desire among all the learned and scientific societies of Great Britain and Ireland to be allowed to have a considerable reduction in the postage rates for the various journals and magazines which are very necessary to the furtherance of the object which these scientific and learned societies have in view. These societies exist for the advancement of science and original investigation in Great Britain ; and it is, to a very large extent, to their fostering care, and to the fact that they afford facilities for the publication of original work, and for the free discussion of such work by circulating large numbers of copies of their proceedings and transactions describing such original work, that the progress of science and research is promoted.' The Postmaster-General, however, was not sympathetic, and gave no hope to the deputation. Judging from the report which has been sent to us, the Postmaster-General could not see the difference between the publications of scientific societies and those of charitable or cyclists' societies !

THE DATING OF SOCIETIES' TRANSACTIONS.

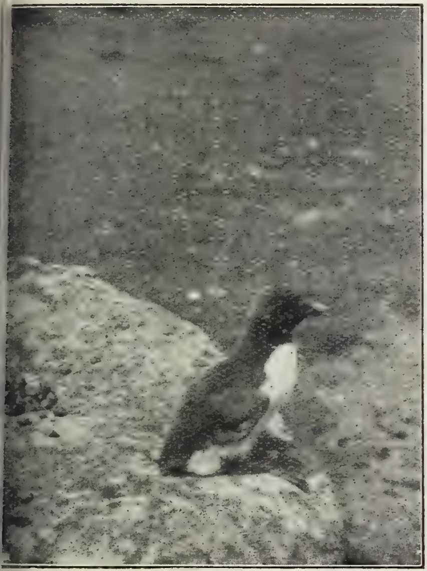
With regard to the question raised in this column for March, which was replied to by Dr. Dwerryhouse, we publish this month a communication from Dr. Bather on this important subject. Few people have had more experience in these matters than has Dr. Bather, hence any opinions of his are of exceptional weight. He has been an editor of scientific publications for twenty-six years, was Secretary of the British Association Committee on Zoological Bibliography and Publication, is Secretary of the British Association Committee for the compilation of an Index Animalium, has been on the staff of the 'Zoological Record' for sixteen years, and is now on the Record Committee. Although the question has arisen in connection with a specific society's publication, it is of very great importance from a general point of view, and we commend the matter to the serious notice of all secretaries of societies, editors of transactions, and others who are in any way responsible for the various publications that are now issued in such numbers. With regard to the Yorkshire Society, we have received other communications, one from a gentleman who has had much experience in these matters, and was at one time connected with this journal. He writes that he was glad to see our protest ' against the continued misdating of the Proceedings of that Society,' which is a constant source of irritation to anyone who respects the properties of journalism, a stumbling block to the bibliographer, and a possible source of grave injustice to an author. The editor's reply betrays an astonishing *naiveté*. We do not expect *his* authors to complain of their papers being anti-dated, but the authors who contribute to other journals which are correctly dated.' It is possible that Dr. Dwerryhouse was not aware of the complaints made to his predecessor.

THE BRITISH ASSOCIATION REPORT (LEICESTER MEETING).

Just as we were going to press with our April number, we received the Report of the British Association for the Leicester Meeting, which was held in July-August last. It is a much smaller volume than usual, though of course, as we are accustomed to find, it is an excellent summary of a year's progress in science. But why it should take eight months to produce the volume, seeing that nearly the whole of it was in type at the Leicester meeting, we cannot possibly understand. Most of the first section of the Report (cxxix pp.) is reprinted from the previous report. The various presidential addresses; reports of the Committees of research; abstracts of papers read; and even the list of members, were in the hands of the members last mid-summer. The various items required putting in order, printing, and indexing, (and the index is a very good one); but, surely this could have been done before this? On account of the unusually early date of the Leicester meeting, one had hoped that for once the Report would have appeared in the same year as the meeting. Instead of which it seems that the earlier in the year in which the meeting is held, the later the date upon which the volume appears. It goes without saying that the report, in accordance with the delay in which it is issued, decreases in value, from a scientific point of view.

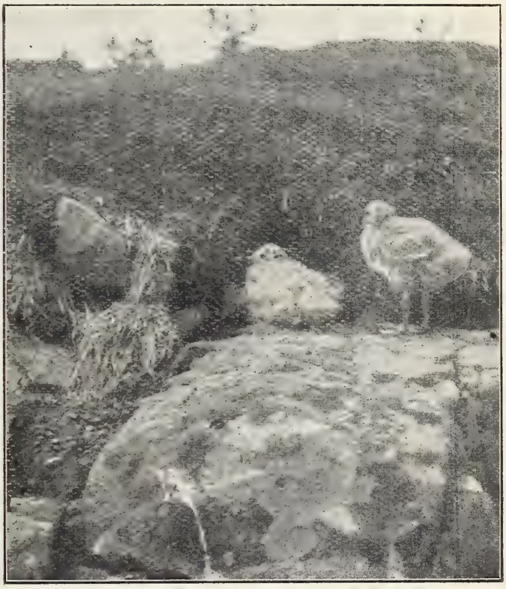
WILD BIRDS' EGGS IN AN INCUBATOR.

The 'Country-Life' for March 21st, 1908, are the results of some experiments made by Mr. F. G. Paynter, on the Farne Islands, during the spring and summer of 1907. He collected eggs of several species of shore and sea-birds that breed on the islands, and placed them in a hot-air incubator, and recorded the period of incubation for each species. The temperature was kept as near 104 degrees as possible throughout the experiment. Care was taken to ensure that the eggs were fresh, and the only question of doubt occurred in the egg of the Razorbill, which Mr. Paynter believed to be quite a fresh one, but he could not be absolutely certain of it. Judging from the result, we should think that this egg had been incubated for several days before being placed in the incubator. The eggs of the various species hatched out after the following periods of incubation :—Arctic Tern and Sandwich Tern in twenty days ; Oyster-catcher, Herring Gull, and Lesser Black-backed Gull in twenty-one days ; Ringed Plover and Razorbill in twenty-five



Fortune, F.Z.S.]

Young Razorbill



[*Photo*

Young Black-Backed and Herring Gulls.

days ; Eider Duck in thirty-one days ; the Guillemot in thirty-two days ; and the Puffin in thirty-six days. Whilst the experiments were being made by Mr. Paynter, he was visited by two members of the Yorkshire Naturalists' Union, and some photographs of the birds reared in the incubator were secured' which are reproduced herewith.

METRIORHYNCHUS BRACHYRHYNCHUS.

Under the above name, Mr. E. T. Leeds has recently described two imperfect skulls, to the Geological Society of London. They were found in the Saurian zone in the Lower Oxford Clay near Peterborough. No other parts of the skeleton were found with them, even the mandibles being missing. The two specimens belong to the same species, and after comparison with descriptions, figures, and photographs of other specimens, they have been referred to *Metriorhynchus brachyrhynchus.* This is believed to be the first recorded occurrence of the species in England ; and the specimens help to throw additional light on the cranial osteology of the species, especially in the parts which are wanting in the type-specimen.

VARIETIES OF *BOARMIA REPANDATA*.

At a recent meeting of the Lancashire and Cheshire Entomological Society, the evening was devoted to an exhibition of *Boarmia repandata* and its varieties. Long series of the moth from various localities, chiefly from the north of England and from Wales, were shown by Mr. Robert Tait, junr., Mr. C. F. Johnson, and Mr. William Mansbridge. The rich dark mottled form from Delamere Forest, the greyish white blotched race with the locally rare melanic aberration, also with white blotches, from Penmaenmawr; melanic varieties from Mansfield and Huddersfield, as well as absolutely black aberrations from Knowsley, Lancashire; the common London forms from Epping Forest and Wimbledon; var. *conversaria* from North Cornwall and New Forest; besides a series of pale-coloured moths from various localities, were all represented. Mr. Tait stated that in breeding from extreme forms of *B. repandata* about 75 % followed the parents, but he had found it difficult to get black varieties to pair. He also remarked how closely the predominating pale form from North Wales resembled the bare rocks upon which it rested in the daytime. Mr. Johnson, in his series from Maer Wood and Burnt Wood, Staffs., remarked on the great difference shewn by the species in these two localities, only four miles apart. Those from the former locality were chiefly very dark greyish black, and the latter place gave a lighter and much *browner* form.

BRITISH MUSEUM NATURAL HISTORY

for the ability of the Society's Editor, Mr. C. E. B. Bowles. The volume contains over 370 pages, and numerous illustrations. We are pleased to see that the whole of the various pages refer to Derbyshire, and whilst several are out of the scope of 'The Naturalist,' the following items will be of interest to our readers: 'The names of the Derbyshire and Staffordshire Barrows' by S. O. Addy; 'Notes on some Derbyshire Antiquities from Samuel Mitchell's Memoranda,' by John Ward; 'A first list of Derbyshire Agarics,' by our contributor, Mr. T. Gibbs; 'Ornithological Notes from Derbyshire for the year 1907,' by Rev. F. C. R. Jourdain; and 'Excavations at the Roman Camp at Melandra,' by R. Hamnett. In addition to his 'list,' Mr. Gibbs gives some useful introductory remarks relating to the study of Fungi, and these are illustrated by drawings.

A DERBYSHIRE STONE AXE-HEAD.

In addition to the more lengthy papers, the Editor has wisely drawn attention, by means of shorter notes, to recent important discoveries, as well as to the principal books dealing with the county, which have been published during the preceding twelve months. This is a valuable feature. One of the 'finds' to which notice is directed is a polished neolithic axe-head, found at Taddington. An illustration of this is given, actual size, which we are kindly permitted to reproduce.

Taddington Celt.

NOTICES ISSUED BY THE YORKSHIRE NATURALISTS' UNION.

The following notices have been issued by the Yorkshire Naturalists' Union, in the form of posters, and copies will be gladly sent to anyone applying to Mr. Fortune for them. 'The Wild Birds and Eggs Protection Committee of the Yorkshire Naturalists' Union wish to draw the attention of the public to the fact that all wild birds nesting upon the promontory of Spurn, and their eggs, are strictly protected by law, and that any person or persons interfering with them will be prosecuted. A suitable reward will be given to anyone giving information which will lead to the conviction of offenders. Information may be sent to any of the following:—W. H. St. Quintin, Esq., J.P., Chairman of Committee, Scampston Hall, Rillington, York; R. Fortune, F.Z.S., Haywra Street, Harrogate; T. H. Nelson, M.B.O.U., Seafield, Redcar, Hon. Secs. to the Committee, or to S. Robinson, Gamekeeper, Kilnsea, the Committee's Watcher over Spurn.'

WILD BIRDS PROTECTION ACTS.

'The Wild Birds and Eggs Protection Committee of the Yorkshire Naturalists' Union wish to draw the attention of the public to the fact that all Birds (with the exception of the House Sparrow), are protected during the nesting season, and assistance is particularly desired in protecting the following species and their eggs, as on account of ceaseless persecution some are threatened with speedy extinction as breeding species in the county:—Buzzard, Dotterel, Dunlin or Stint, Goldfinch, Grebes, Kestrel, Kingfisher, Linnet, Nightingale, Owls, Peregrine Falcon, Raven, Stone Curlew, Turtle Doves, Wood Peckers. *Note*—These birds (and others) are protected *all* the year round.

The Committee will suitably reward any person giving information that will lead to the conviction of anyone infringing the Wild Birds Protection Acts. And also as to the setting of Pole Traps, which has been declared illegal by Act of Parliament. These traps are responsible for a great amount of cruelty and suffering, in addition to the destruction of numbers of harmless and inoffensive birds. Information may be sent to any of the undermentioned:—W. H. St. Quintin, Esq., J.P., Scampston Hall, Rillington, York, Chairman of the Committee; R. Fortune, F.Z.S., Haywra Street, Harrogate, and T. H. Nelson, M.B.O.U., Seafield, Redcar, Hon. Secretaries.'

MANX ORNITHOLOGICAL NOTES, 1907.

P. G. RALFE.
Castletown.

16th January—A Kingfisher was taken in Castletown Harbour, and did not long survive its capture. On 20th January, another, according to the 'Ramsey Courier' was seen in the harbour of that town. The species occurs all over the Island from time to time, but has not been proved to breed here, and many of its appearances seem to point to migration.

3rd February—I saw a single Goldfinch at Scarlett.

4th March—A Gannet off Scarlett: unusual at so early a date.

26th March—Six Wheatears, in company with small parties of Meadow Pipits, doubtless also migrating.

1st April—About ten House Martins seen at Glenmay by Mr. F. S. Graves and myself, in very fine summer-like weather. One Chiffchaff heard at the same place.

7th April—One Purple Sandpiper, the last of the season.

16th April—A Missel Thrush, sitting on eggs in Scarlett limestone quarry. The situation was singularly exposed, the nest being placed on a plank amid the machinery. The foreman nailed a board up to protect it from view of the passers-by, but later it was robbed, probably by Jackdaws. Last year a nest of this species, perhaps of the same birds', was placed on a crane in this quarry, and nests on ledges of rock are frequent in the district.

5th May—A few White Wagtails at their usual haunt on the shingle at Sandwick. I continued to see them here until 26th of May, when I left the Island for nearly three weeks.

18th, 19th, 20th May—With Mr. F. S. Graves on the Calf of Man. We met with a number of migrant small birds, among them a Whinchat, a few Spotted Flycatchers, Sedge Warblers, and Whitethroats. These birds take advantage of the trees and bushes around the one farm on the islet, and of some slight cover in the little ravine called the Glen. A pair of Magpies has nested in low trees on the Calf. We saw a flock of Tree Sparrows near the farm-house.

24th May—In Ballaugh Curragh with Mr. T. H. Graves. We heard a Grasshopper Warbler, and found, as usual, Sedge and Willow Warblers very common. Mr. W. E. Cottier showed us two Curlew's nests in the low meadows near Sulby Glen

Station. The bird seems to be increasing as a breeding species in this neighbourhood.

20th June—About this time a Common Buzzard was taken by a boatman on the Calf of Man, as recorded in 'Zoologist,' August 1907, p. 308. About the same time another was obtained in Glen Auldyn, and is now in the Ramsey Museum. In November and December, a third specimen, which wanted a tail, was observed by Mr. F. S. Graves and others soaring over the Curragh at Greeba.

5th July—Saw seven or eight nests of Arctic Tern at the only Manx breeding place, mostly with eggs.

18th July—Found a second colony of Kittiwakes on our South Coast, perhaps fifty pairs ('Zoologist,' August 1907, p. 308).

20th August—A few Sanderlings at Sandwick. They seem to occur in small numbers each spring and autumn with Dunlins and Ringed Plovers.

12th September—Saw a Kingfisher on the shore at Poolvash.

27th October—Saw the last Swallows, about six.

7th November—Saw first Purple Sandpipers of the season at Scarlett. Seven on Langness on 21st.

19th November—The Isle of Man Hunt put up nearly a dozen Short-eared Owls from a turnip field at Ballatrollog. Mr. G. Storey tells me they have been very common in the fields of the Southern district this autumn.

26th December—A few 'Hunt the Wrens' turned out in Castletown this morning, though the weather was very cold and stormy.

GEOLOGY.

Marine Beds in the Coal Measures near Doncaster.—('Naturalist,' February 1908, p. 39).—The position of the bed below the Melton Field (Wath Wood) Coal should have been stated as 100 feet below that seam, and 382 feet above the Barnsley Coal.—H. Culpin.

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BIRDS.

Great Grey Shrike near Whitby.—A fine example of the Great Grey Shrike (*Lanius excubitor*) was shot on the Mulgrave Estate on March 26th. The skin has been preserved and mounted for the Rev. Marquis of Normanby.—T. Stephenson, Whitby.

PLANT GEOGRAPHY AND ECOLOGY IN SWITZERLAND.*

(PLATE XV.)

T. W. WOODHEAD, Ph.D., F.L.S.

DURING my stay in Zürich (1905-1906), an opportunity was afforded me of seeing much of the work done in the direction of plant-geography and ecology, under the guidance of Dr. C. Schröter, professor of botany in the Federal Polytechnic.

As these subjects are exciting a considerable amount of interest in Great Britain at the present time, and especially in the North of England, it might be useful to indicate, as well as limited space will permit, the extent and nature of the work accomplished by Swiss botanists, and so draw attention to papers which might otherwise be overlooked by workers here.

The interest of Swiss botanists in plant-geography is of long standing, and the number of workers very great, so much so as to render it impracticable to give a complete bibliography. I have, however, attempted to particularise the more important items, and for the benefit of those who may wish to examine a larger series of the original papers, I have given where possible references to a Swiss bibliography,† which is indispensable to anyone desiring a complete list. In the following notes, therefore, the year of publication, and the page number of 'Flora Helvetica' will be given in brackets, *e.g.* Josias Simler, (1633, F. H. 4) means that Simler's work was published in 1633, complete reference to which will be found in 'Flora Helvetica' under that date on page 4. By this means many more papers can be indicated than would otherwise have been practicable.

In the preparation of this paper, I have received the greatest assistance from Prof. Schröter, who went to considerable trouble in gaining for me access to the original papers, a number of which, especially the more recent ones, he generously presented to me.

EARLY PERIOD.—Swiss botanists were early in the field in recognising the fundamental principles of geographical botany, and in such a country as Switzerland, one is not surprised to find that the earliest contribution, that by Josias Simler (1633, F. H. 4), deals with alpine plants.

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* An abstract of this paper appeared in the Report of the British Association, York Meeting, 1906, p. 74.

† 'Flora Helvetica,' 1530-1900. 'Fascikel IV.5 Bibliographie der schweizerischen Landeskunde. Ed. Fischer. Bern, 1901.' This bibeiography is continued and kept up to date in the 'Berichte der schweizlrischen botanischen Gesellschaft.' Bern, K. J. Wyss.

Seventy years later Scheuchzer (1702-4 and 1706-8, F. H. 5), another Swiss who made many excursions in the country, described a number of new species, and speculated on the causes producing the dwarf habit of these plants, attributing it to the diminution of air pressure on the principle of communicating tubes. It was left for Haller (1768, F. H. 9) to give the first sketch of vegetation regions or vertical zones in Switzerland, but he gives no types of altitude.

In 1813, Wahlenberg (F. H. 74), a Swede who had travelled in North Switzerland, determined the limits of vegetation, and characterised the leading types. A few years afterwards, Kasthofer (1822 and 1825, F. H. 80), a forester and excellent observer, wrote accounts of excursions in the Swiss Alps, which contain many good observations on forests, their former and present limits, the influence of climate and man on forests, also useful hints on replanting.

In 1831, Hegetschweiler (F. H. 74), a man much in advance of his contemporaries, made many experimental cultures on Swiss plants, paying special attention to the effect of environment on plant form. He was one of the first to study the plasticity of plants, and the effect upon them of different conditions.

At this time, Oswald Heer, a young man of twenty-two, who became afterwards professor of botany in the University of Zürich, was actively at work studying the natural history of Glarus, his native Kanton. In 1836 (F. H. 127) he published an account of the vegetation of the south-eastern portion of Kanton Glarus, describing the results of his observations on climate, soil, and vertical zones of vegetation. He concludes with a list of species in which he characterises in an excellent manner, the particular habitats of the species. It was in this paper that he introduced the term 'Schneethälchen,' those little hollows high up in the Alps where the snow remains long after it has disappeared from the surrounding parts, such areas possessing a strikingly characteristic and interesting flora.

The example thus set of studying a limited area from an ecological, as well as from a floristic point of view, has since been largely followed in Switzerland. Many of the recent Monographs are modelled upon it, and they furnish favourite themes for inaugural dissertations. Heer took a wide interest in

Natural History, and wrote many papers on Entomology, Botany, and Palæontology.* In a little paper (1845, F. H. 15), on the upper limits of plant and animal life in the Swiss Alps, he gives the results of many interesting and suggestive observations on the mode of life of insects and plants at high altitudes.

From this time onward, the study of plant-geography and ecology has been pursued by many active workers, and in very varied directions. The earliest part of this period was characterised by several important works. The brothers Schlagintweit (1850 and 1854, F. H. 81), published the results of many valuable observations on the limits of trees, vegetation zones, including zones of cultivation, growth of woody plants at high altitudes, etc. It was at this time that Thurman (1849, F. H. 89) published his well-known work on the influence of soils on the distribution of plants in the Jura, the principles there brought out were largely used among others both by Baker, in his Flora of 'North Yorkshire,' and by Lees, in his 'Flora of West Yorkshire.'

Four years earlier than this, Lesquereux (1849, F. H. 59) gave the results of his important observations on peat moors, especially 'high moors,' laying a solid foundation on which later work has been based. A few years later Alfonse De Candolle (1855), issued his 'Geographical Botany,' and this was followed (1875, F. H. 83) by a discussion of the influence of the duration of glaciation upon the richness of the Alpine flora. The Alpine flora naturally attracted the attention of the botanists ,and much was written, and many speculations advanced respecting the distribution and origin of this interesting element in their flora.

H. Christ, an active lawyer, was reading papers before the members of the Alpine Club, and accumulating materials for what was afterwards to become the most enjoyable and excellent work on the Swiss flora. His 'Pflanzenleben der Schweiz,' (1879, F. H. 76), not only summarises the work of the preceding period, but is, except for formations and adaptations, a complete geo-botanical monograph of Switzerland, dealing fully with the different zones and regions, influence of climate, soil, geographical elements, as well as the history and immigration of the flora. It is indeed a model work of its kind, and is ob-

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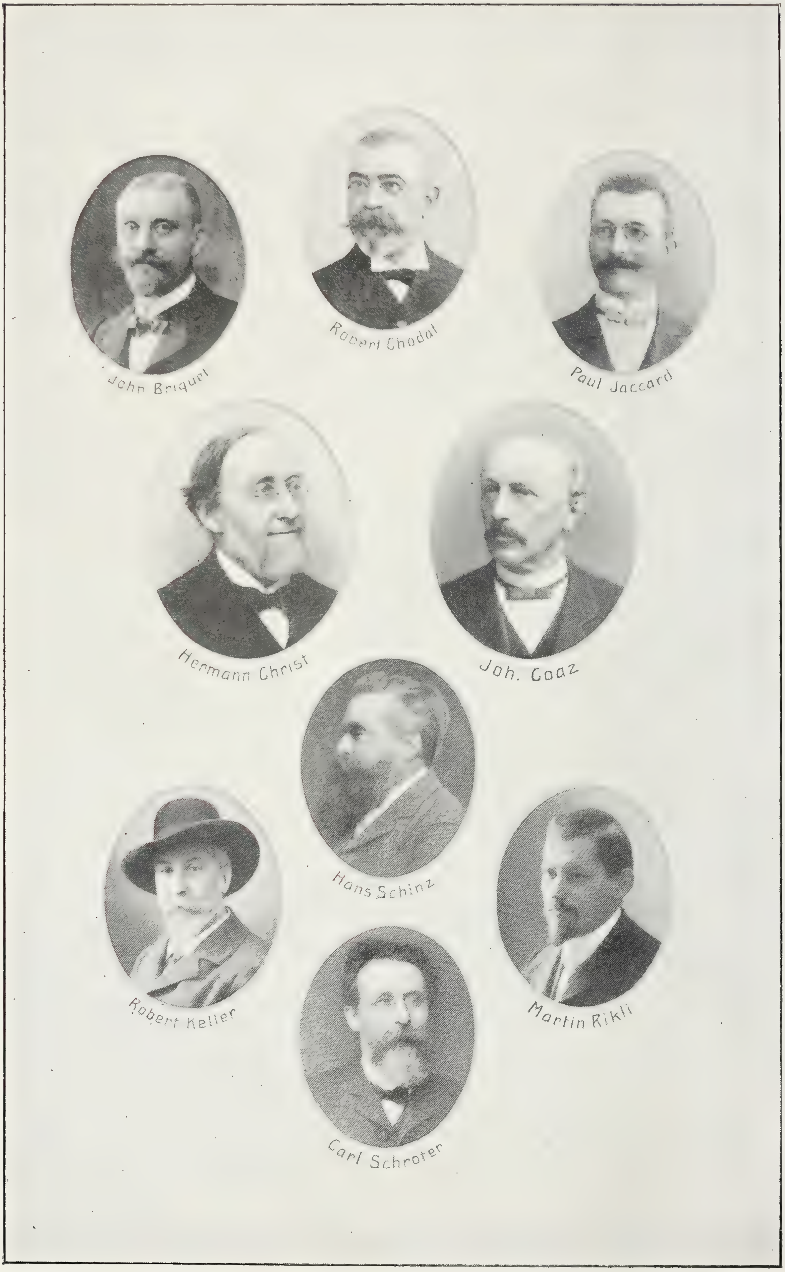
* For an interesting account of Heer's life and work, see 'Oswald Heer's Leben,' by C. Schröter and J. J. Heer. Zürich, 1885.

BRITISH MUSEUM NATURAL HISTORY



Swiss Botanists.

viously written by a man equally in love with his subject and his country. Though in some respects the best, it was by no means the last word to be said on the matter, for in the eight and twenty years that have elapsed since its publication, some 350 separate contributions have been made to the subject, the most important emanating from the Polytechnicum and the University in Zürich, under the direction of Prof. C. Schröter, Prof. P. Jaccard, Dr. Rikli and Prof. H. Schinz, and from Geneva by Prof. Chodat and Dr Briquet.

Space will not allow of more than grouping this mass of material, and saying a few words about each group in order to indicate the nature and extent of the work accomplished.

HISTORY OF THE FLORA.—Much has been written on the origin and history of the Swiss flora, and especially upon the Alpine element. The chief contributions are by Christ in the work referred to above, Schröter (Die Flora der Eiszeit, 1883), deals with the fossil glacial plants of Switzerland and elsewhere. Heer (1883, F. H. 85), discusses the Arctic origin of many species and gives a list of 336 species occurring above 2,600 metres.

Briquet (1890, 1898, 1899, F. H. 144 and 145), has made several contributions on the history and immigration of the flora, and discusses in much detail the xerotherm elements and the xerotherm period, and more recently in a paper published in the scientific results of the International Botanical Congress of Vienna, 1905.

Chodat (1895, F. H. 118), also discusses these questions, dealing especially with preglacial forms, origin of Arctic elements, and the immigration of Southern Wallis plants through the high passes from the Aosta Valley.

Marie Jerosch †, at the suggestion of Prof. Schröter, collected together in a most painstaking and thorough manner. the materials concerning the history and origin of the Swiss Alpine flora. These are presented in an excellent form, together with many suggestions and observations of her own forming, a work indespensable to anyone interested in problems concerning the history and distribution of Alpine plants.

In Früh and Schröter's 'Moore der Schweiz' ‡, Schröter

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* Christ has recently given a summary of the work done since 1879. 'Aperçu des récents travaux géobotaniques concernant la Suisse.' Ble, 1907.

† M. Ch. Jerosch, 'Geschichte und Herkunft der schweizerischen Alpenflora.' Leipzic, 1903.

‡ J. Früh and C. Schröter, 'Die Moore der Schweiz.' 1904.

gives a complete account of our present knowledge upon the post-glacial history of vegetation in Northern Switzerland.

The history of cultivated plants has also received considerable and detailed attention. The papers deserving special mention are :—Oswald Heer, in 1847 wrote a history of Swiss agriculture, and later, T. Schlatter (1892-1896, F. H., 138), wrote a more detailed study of the cultivated plants of St' Gallen and Appenzell. These dealt with the former distribution of forests, former cultivation of cereals, vine, etc.

Hartwich (1893), deals with the cultivation of medicinal plants. Walser (1896, F. H., 141), discusses the changes that have occurred in lakes, forests, and vine cultivation since 1677. The sites of former lake dwellings have been carefully explored, and the results recorded in many interesting papers. The more important are by Heer (1861-4-5, F. H., 191), Uhlmann, (1875, F. H., 191), Schröter, (1894, F. H., 191), Hartwich, (1889, F. H., 192), and Neuweiler.* This latter paper contains a critical enumeration of all the wild and cultivated plants (except wheat, barley, and rye), of which there are pre-historic remains, giving in all 220 species.

Ecological Studies of the Alpine Flora are very numerous. Heer (1883, F. H., 85), Schröter, Christ, Keller (1887, F. H., 192), Briquet, Leist (1890, F. H., 193), Fisch (1889, F. H., 192), Bühler, Imhof, Vogler, and Oettli are a few of the names that may be mentioned in this connection. Schröter's recently completed 'Pflanzenleben der Alpen,' (Zürich, 1904-7) brings together, in an eminently readable form, from a very extensive literature as well as from his own life-long observations, all the interesting details as to habit, structure, and adaptations of plant life in the Alps. It is by far the most important work which has yet appeared on the subject, and it is to be hoped that an English translation will soon be forthcoming.

(*To be continued*).

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The third International Congress of botanists will be held at Brussels from May 14th to May 22nd, 1910.

In 'The Museum News' (Brooklyn, N. Y.), for April, is an article on the Giant Stork, or Jabiru, in which the tenacity of life of the bird is referred to. The writer has personal knowledge of an instance where one of these birds, after being hit with a soft-nosed 8 mm. bullet from a mauser rifle which literally tore one half of the body from the bird, took wing and flew for a distance of almost a mile before finally dropping lifeless to the ground. It was in Amerrica.

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* E. Neuweiler, 'Die prähistorischen Pflanzenreste Mitteleuropas,' Vierteljahrs. d. naturforsch. Ges. Zürich, 1905.

THE ICE-BORNE BOULDERS OF YORKSHIRE.

J. H. HOWARTH, J.P., F.G.S.

(*Continued from page 146*).

GENERAL DISTRIBUTION OF YORKSHIRE ERRATICS.

As stated in the introductory observations, the boulders selected here for tabulation because their character and approximate source are identifiable, are everywhere accompanied by others, often in far greater numbers, which have joined the former on their travels as picked up by the moving ice.

These are by no means to be ignored in studying the glacial problems of the county, since they throw much light, of course, upon the ice movements when considered in greater detail.

The following tables are reproduced from Reports of the Committee, and will be found interesting and instructive. They are the results of excellent work done by members of the East Riding Boulder Committee :—

BOULDERS NOTED ON THE HOLDERNESS COAST BETWEEN WITHERNSEA AND HORNSEA, 1895.

TABLE I.

BOULDERS Over One Foot in Diameter.	A	B	C	D	E	F	G	H	I	J
	Withernsea to Sand-le-Mere. T. Sheppard and J. W. Stather August 17th, 1895.	Sand-le-Mere to Tunstall. T. Sheppard and J. W. Stather. August 1895.	Tunstall to Hilston. W. H. Crofts and T. Sheppard. August 1895.	Hilston to Thorp Garth. J. W. Stather. August 1895.	Thorp Garth to Aldborough. J. W. Stather. August 1895.	Aldborough to 1 Mile N. Members Hull Society. April 1895.	1 Mile N. of Aldborough to Mappleton. Hull Society. April 1895.	Mappleton to Hornsea. Hull Society. April 1895.		
Origin.	3 Miles	1 Mile	1½ Miles	3½ Miles	½ Mile	1 Mile	2 Miles	2½ Miles	Totals	Per Cent.
Carboniferous Limestone ...	38	103	24	25	57	197	36	54	534	25·8
Sandstone, Grits, etc. chiefly Carboniferous ...	12	49	19	13	17	85	33	47	275	13·3
Mesozoic Rocks. Lias Shale ...	4	38	37	19	58	121	34	34	345	30·8
Mesozoic Rocks. Chalk... ...	3	8	8	3	11	80	46	28	187	
Mesozoic Rocks. Other Limestones and Sandstones. ...	2	5	21	5	14	26	12	19	104	
Basalts and other eruptive rocks.	16	64	31	25	74	285	23	36	554	26·7
Granite, Schist, Gneiss, etc.	7	7	4	5	9	30	2	7	71	3·4
TOTALS	82	274	144	95	240	824	186	225	2070	100·0

I. The above is a rough classification of 2,070 boulders (above a foot in diameter), noted on the Holderness coast between Withernsea and Hornsea, a distance of 14 miles, during the summer of 1895.

II. All the boulders tabulated in Sections A, B, C, D, E, G, H, in above table, were in situ in the clay, or were close to the boulder-clay cliff from whence they were recently fallen. In section F, however, a large group of boulders occurred at about 'half-tide,' and these are included in the Table.

III. Table I. gives the actual number of boulders noted in the different sections of coast. Table II. gives the percentage of the different classes of the rocks.

IV. The largest boulder seen was a block of Carboniferous limestone on the beach near Mappleton, 85 in. × 31 in. × 30 in. + and many others approaching this size.

A block of garnetiferous schist was noted at the base of cliff near Cowden, 22 in. × 30 in. × 13 in.

TABLE II.

BOULDERS Over One Foot in Diameter.	A	B	C	D	E	F	G	H
	Withernsea to Sand-le-Mere	Sand-le-Mere to Tunstall.	Tunstall to Hilston.	Hilston to Thorp Garth.	Thorp Garth to Aldborough.	Aldborough to 1 Mile N.	1 Mile N. of Aldborough to Mappleton.	Mappleton to Hornsea.
	3 Miles	1 Mile.	1½ Miles	3½ Miles.	½ Mile.	1 Mile.	2 Miles.	2¼ Miles.
Origin.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Carboniferous Limestone, including possibly a few other Palæozoic Sedimentary Rocks.	46·4	37·6	16·7	26·3	23·8	23·9	19·4	24
Sandstones, Grits, etc., probably all from Carboniferous or other Palæozoic Rocks.	14·6	17·9	13·2	13·7	7·1	10·3	17·7	20·9
Mesozoic Rocks, Jurassic Limestones and Sandstones, Chalk, etc.	11	18·6	45·8	28·4	34·6	27·6	49·4	36
Basaltic and other Eruptive Rocks.	19·5	23·4	21·5	26·4	30·8	34·6	12·4	16
Granite, Schist, Gneiss, etc.	8·5	2·5	2·8	5·2	3·7	3·6	1·1	3·1
	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·1

TABLE AA.—BOULDERS NOTED ON THE HOLDERNESS COAST BETWEEN BRIDLINGTON AND SPURN POINT.

All the boulders tabulated were in situ in the clay, or were close to the cliffs from which they had recently fallen. For convenience of comparison the 36 miles of coast are divided into sections A, B, C, etc., usually indicated by some well-marked natural feature or landmark. The figures in light type indicate the actual number of boulders noted in each section. The figures in dark type give the relative percentage.

BOULDERS One Foot and Upwards in Diameter.	A	B	C	D	E	F	G	H to O	P	Q	R	S	T	U	V		
	Spurn (Warren) to Kilnsea. J. W. Stather.	Kilnsea to Easington Lane end. J. W. Stather.	Easington Lane to Cliff House. J. W. Stather.	Cliff House to Out Newton. J. W. Stather.	Out Newton to Nevills Dyke. J. W. Stather.	Nevills Dyke to Hollym Mill. T. Sheppard and J. W. Stather.	Hollym Mill to Withernsea. T. Sheppard and F. F. Walton.	See 1895 Report for Details.	Hornsea to Atwick Gap. J. W. Stather.	Atwick Gap to 1st Gap N. of Atwick. J. W. Stather.	1st Gap N. of Atwick to Skipsea Peat-bed. W. H. Crofts and T. Sheppard.	Peat-bed to Skipsea Brough. W. H. Crofts and T. Sheppard.	Skipsea Brough to Barmston Outfall. T. Sheppard.	Barmston Outfall to Earls Dyke. T. Sheppard.	Earls Dyke to Bridlington. T. Sheppard.	Totals.	Mean Percentage.
Origin.	1 Mile.	2 Miles.	1½ Miles.	2 Miles.	1½ Miles.	1 Mile.	1½ Miles.	14 Miles.	1½ Miles.	1½ Miles.	1½ Miles.	½ Mile.	2 Miles.	2 Miles.	3 Miles.	36 Miles.	
Carboniferous Limestone	2 **13·3%**	23 **32·0%**	21 **36·8%**	101 **37·8%**	12 **40·1%**	31 **37·8%**	17 **30·3%**	534 **25·8%**	11 **18·6%**	7 **12·2%**	21 **27·3%**	1 **2·8%**	10 **6·1%**	1 **4·0%**	1 **2·7%**	793	**25·5%**
Sandstone, Grits, etc., chiefly Carboniferous	1 **6·7%**	11 **15·2%**	3 **5·2%**	33 **12·2%**	6 **20·0%**	10 **12·2%**	5 **9·0%**	275 **13·3%**	12 **20·3%**	14 **24·5%**	29 **37·6%**	28 **77·7%**	95 **58·3%**	17 **68·0%**	26 **70·3%**	565	**20·7%**
Lias	1 **6·7%**	1 **1·4%**	6 **10·6%**	15 **5·6%**	1 **3·3%**	3 **3·6%**	2 **3·5%**	345 **16·8%**	1 **1·7%**	— —	— —	1 **2·8%**	6 **3·7%**	2 **8·0%**	2 **5·4%**	386	**10·4%**
Chalk	1 **6·7%**	10 **13·9%**	2 **3·5%**	5 **1·9%**	1 **3·3%**	10 **12·2%**	5 **9·0%**	187 **9·0%**	6 **10·2%**	21 **36·8%**	20 **26·0%**	5 **13·9%**	29 **17·8%**	1 **4·0%**	0 —	303	**10·1%**
Other Mesozoic Rocks, chiefly Sandstones	1 **6·7%**	9 **12·5%**	2 **3·5%**	10 **3·7%**	3 **10·0%**	9 **11·0%**	5 **9·0%**	104 **5·0%**	5 **8·5%**	8 **14·3%**	— —	— —	5 **3·1%**	1 **4·0%**	1 **2·7%**	163	**5·3%**
Basalts and other eruptive Rocks ...	6 **40·0%**	15 **20·8%**	16 **28·1%**	77 **28·8%**	6 **20·0%**	19 **23·2%**	21 **37·5%**	554 **26·7%**	16 **27·2%**	6 **10·5%**	6 **7·8%**	1 **2·8%**	15 **9·2%**	1 **4·0%**	6 **16·2%**	765	**23·6%**
Granites, Schist, Gneiss, etc....	3 **19·9%**	3 **4·2%**	7 **12·3%**	26 **9·8%**	1 **3·3%**	— —	1 **1·7%**	71 **3·4%**	8 **13·5%**	1 **1·7%**	1 **1·3%**	— —	3 **1·8%**	2 **8·0%**	1 **2·7%**	128	**4·4%**
Totals... ...	15 **100·0%**	72 **100·0%**	57 **100·0%**	267 **100·0%**	30 **100·0%**	82 **100·0%**	56 **100·0%**	2070 **100·0%**	59 **100·0%**	57 **100·0%**	77 **100·0%**	36 **100·0%**	163 **100·0%**	25 **100·0%**	37 **100·0%**	3103	**100·0%**

NOTES (Table AA).—In sections A and B several small boulders of Augite syenite (Laurvikite of Brögger) were observed sticking in the clay cliff; while 2 blocks (each 15 inches in diameter) and 30 smaller boulders of the same rock occurred on the shore.

In section D a boulder of Shap occurs on the beach, along with a fine sample of Augite syenite, 2 feet in diameter.

For details of section H to O see 1895 Report.

Sections P. and Q.—Many crushed-out chalk boulders in the cliff. A boulder of Augite syenite on the shore (2 ft. by 1½ ft. by 1 ft.), and several smaller specimens. Here also Rhomb porphyry was found in situ in the cliff.

The relative scarcity of the harder rocks in some of the sections North of Hornsea is due in part, a any rate, to the efforts of the local road menders.

REPORT OF THE EAST RIDING BOULDER COMMITTEE, SEPTEMBER 1st, 1896.

The Committee, since the presentation of the report (page 6), have noted upwards of 2,600 boulders, chiefly in Holderness.

TABLE AA.—Gives the results of the systematic survey of boulders in situ in the cliffs of Holderness between Spurn and Bridlington.

TABLE BB.—Gives an analysis of three representative beach groups.

TABLE CC.—Refers to Red Cliff (N. Ferriby), and is similar to AA.

TABLE DD.—Refers to Redcar and Saltburn, and is similar to AA.

The remainder of the report consists of notes of inland erratics.

Three typical groups of boulders on the beach of the Holderness coast, illustrating the Selective and Arranging power of the waves.

TABLE BB. BOULDERS OF ONE FOOT AND UPWARDS IN DIAMETER.	On the beach between Bridlington & Skipsea. T. Sheppard. Group I.	On the beach just South of Withernsea. J. Stears, M. Carmichael, W. S. Parrish. Group II.	On the beach near Earl's Dyke. T. Sheppard, J. W. Stather. Group III.	
Carboniferous limestone	12	52	210	274
Sandstone, Grits, etc. (Probably all Carboniferous) ...	134	9	40	183
Lias	0	1	8	9
Chalk and Flint	In large numbers	1	3	4
Other Mesozoic rocks	—	4	3	7
Basalts, etc.	2	42	485	259
Granites, etc.	—	—	29	29
TOTALS	148	109	778	1,035

TABLE CC.

Reported by Mr. J. W. STATHER.

NORTH FERRIBY.

In the boulder clay cliff on the Humber shore near North Ferriby, and on the adjacent beach, 373 boulders noted of 8 in. and upwards in diameter, the classification of which yields the following result :—

		Per cent.
69	Carboniferous limestones	18·5
104	Sandstones, grits, conglomerate, etc. (probably nearly all from Carboniferous or palæozoic rocks)	27·9
49	Sandstones etc., probably nearly all of Mesozoic Age ...	13·1
21	Lias	5·9
10	Chalk (including 4 black flints)	2·6
88	Basaltic and other eruptive rocks	23·5
32	Granites, schist, gneiss, etc.	8·5
373		100·0

TABLE DD.

Reported by Mr. PAUL DAVIS and Mr. J. W. STATHER.

REDCAR AND SALTBURN.

In the boulder clay cliffs between Redcar and Saltburn (four miles) 133 boulders, a foot and upwards in diameter, were observed. The classification of these boulders yields the following results :—

		Per cent.
50	Carboniferous limestones	37·6
28	Sandstones and grits of undoubtedly Carboniferous age	21·1
12	Sandstones, origin doubtful, but probably in part Carboniferous	9·0
7	Magnesian limestone	5·3
15	Lias	11·3
21	Basaltic rocks	15·8
133		100·0

MR. J. W. STATHER, F.G.S., AND RELATIVE DISTRIBUTION.

'THE following table, showing the boulders of two selected localities in the southern part of the Yorkshire Coast and two in the northern part, will serve to illustrate the general distribution :—

	Dimlington.	North Ferriby.	Whitby.	Saltburn.
	Per cent.	Per cent.	Per cent.	Per cent.
1. Carboniferous sandstones and limestones... ...	55	59	70	73
2. Basalt (whin-sill)	32	30	24	20
3. Magnesian limestone ...	—	—	5	7
4. Granite, gneiss, etc. ...	13	11	1	0
	100	100	100	100

'The investigation shows—(1) The proportion of Carboniferous sandstones and limestones increases northward. (2) The whin-sill increases southward proportionately though not numerically, probably bearing transport better than (1). (3) The Magnesian limestone in the form of *large* boulders disappears southward. (4) The granites, gneisses, etc., decrease both proportionately and in numbers northward, except in the Shap granite and the Cheviot porphyrites, which show a rapid increase in the same direction. A considerable number of (4) agree with well-known rock types of Scandinavia, and these are more plentiful in the south of the county and in Lincolnshire than in North Yorkshire. The unknown rock types included in the same group agree in this respect with these recognisable Scandinavian rocks.'

'The distribution of the Cheviot porphyrites, which occur principally as stones and pebbles of smaller dimensions than the boulders of the above table, presents some points of peculiar interest. These, besides increasing in numbers towards their source, are also more abundant in the upper boulder clays and in the gravels at the highest levels ; while, on the other hand, the Scandinavian rocks, either as pebbles or boulders, rarely occur in either position.'

Certain coloured flints and chalk fossils form an interesting feature of the Yorkshire Coast drift.

Pink coloured flints are numerous along the east coast, and are believed to be non-British. They were at one time regarded as of Danish origin, but Mr. A. Tesson, of the Danish Geological Survey, informed Mr. Stather that pink flints do not occur in Denmark either in the Cretaceous rocks or the drift.

Black flints abound in our glacial beds and are also of non-Yorkshire origin; green-coated flints also, though not so numerous.

The high zonal belemnite *B. mucronata* is found in large numbers in east coast drift, but does not occur in Yorkshire Cretaceous beds.

(*To be continued*).

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Mr. G. W. Lamplugh's paper on ' The Gorge and Basin of the Zambezi below the Victoria Falls, Rhodesia,' appears in the ' Geographical Journal ' for February-March, 1908. It is well illustrated.

We have received a pamphlet dealing with the Woltereck Process for the production of Sulphate of Ammonia from Peat. It is published by the Sulphate of Ammonia Co., Ltd., 171 Queen Victoria Street, E.C.

A TIME-TABLE OF BIRD SONG.

W. GYNGELL,
Scarborough.

THE accompanying table is the result of personal observations during many years' residence in the Scarborough district of Yorkshire. The line following the name of each bird through the month of the year shows the earliest and the latest dates (indicated by the figure in the month), when such bird has been heard to sing. The line rises, showing the increasing number of individuals of the species to be heard in full song; rising more or less slowly in the case of resident birds, and usually rapidly with our summer visitors, that burst into song almost immediately on their arrival. The lines reach a moderate height, or a considerable height, just as the bird is a chary or a free singer. With most species it will be seen that the song drops more or less suddenly when the young birds hatch, and does not re-commence until the approach of the following pairing season. Notable exceptions to this rule are the Hedge Sparrow, Wren, Linnet, and Starling, that sing almost all the year round. The Robin has been heard on every day of the year.

Several species of birds common throughout the year in southern counties are chiefly known as summer visitors to the Scarborough district; thus the Pied Wagtail, Meadow Pipit and Corn Bunting, common enough in summer, are usually reduced to mere stragglers from October to March.

It is with regret that the Ring Ouzel, Wheatear, Stone Chat, Dipper, and Reed Bunting are omitted from the list through lack of opportunity to make continuous records of their songs; these species not occurring in sufficient numbers in the district immediately under observation.

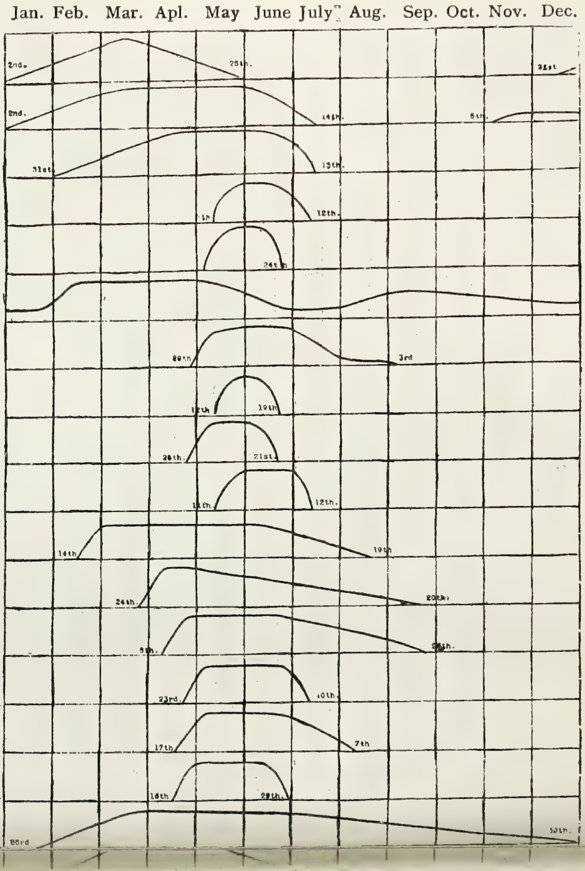
The singing of wild birds kept in confinement is a source of trouble to observers of bird song, and especially is this the case with the Linnet, that as a bird-catcher's decoy bird may be heard singing from a cage beneath some limed twigs in a hedge. The autumn or winter song of the caged Song Thrush is also apt to mislead an observer.

What constitutes the real song of a bird as distinct from its call or alarm notes is not easy to determine in a few species, of which the Martin may be taken as an example. This bird's

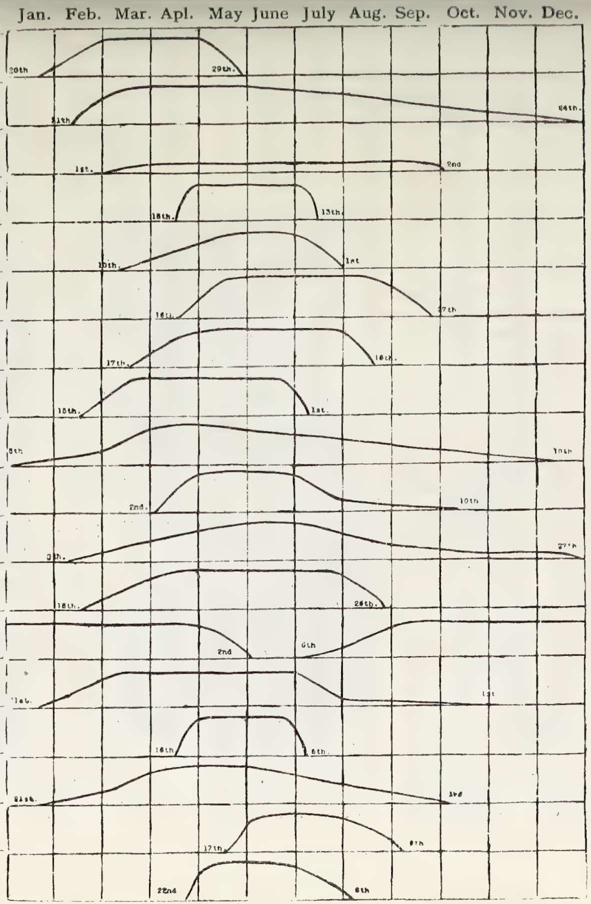
A Time-Table of Bird Song for Scarborough, Yorkshire, England.

Name of Bird.	Local Status.
Mistletoe Thrush . . .	Resident Common.
Song Thrush . . .	Resident Very common.
Blackbird	Resident Very common.
Whinchat	Summer Visitor Common.
Redstart	Summer Visitor Common.
Robin	Resident Very common.
Whitethroat . . .	Summer Visitor Very common.
Lesser Whitethroat . .	Summer Visitor Common.
Blackcap	Summer Visitor Common.
Garden Warbler . . .	Summer Visitor Common.
Golden-crested Wren . .	Resident Common.
Chiff Chaff	Summer Visitor Common.
Willow Wren . . .	Summer Visitor Very common.
Wood Wren. . . .	Summer Visitor Common.
Sedge Warbler . . .	Summer Visitor Very Common.
Grasshopper Warbler . .	Summer Visitor Scarce.
Hedge Sparrow . . .	Resident Very Common.
Great Titmouse . . .	Common.

WHEN IN SONG.



Name of Bird.	Local Status.
Blue Titmouse	Resident Common.
Wren	Resident Common.
Pied Wagtail	Common in Summer Scarce in Winter.
Tree Pipit	Summer Visitor Common.
Meadow Pipit	Common in Summer Scarce in Winter.
Swallow	Summer Visitor Common.
Greenfinch	Resident Very common.
Chaffinch	Resident Very common.
Linnet	Resident Very common.
Redpoll	Common in Summer Scarce in Winter.
Corn Bunting	Common in Summer Scarce in Winter.
Yellow Bunting	Resident Very common.
Starling	Resident Abundant.
Skylark	Resident Very Common.
Cuckoo	Summer Visitor Common.
Ring Dove	Resident Very common.
Turtle Dove	Summer Visitor Scarce.
Land Rail	Summer Visitor Very common.



one note *Fritz* seems to constitute its whole vocabulary. The language of the Blue Titmouse is not easily translated into English. On the other hand, no one could confound the sweet continuous twittering song of the Swallow with its 'chissick' alarm note.

The grating call of the Corn Crake is included in the time-table of *song*—the bird also has other notes than its 'crake,' and is not the 'crake' as musical as the voice of the Grasshopper *Warbler?*

◆

A movement is on foot for the provision of a local historical museum for Manchester.

We regret to record the death of Mr. J. T. Carrington, which occurred on March 5th, at Combe Martin, in Devonshire. He was born in 1846, and was a well-known entomologist. He will be perhaps better known however, from the fact that from 1893 he edited 'Science Gossip,' until that journal ceased in 1902. Our entomological friends have also recently lost another worker—Mr. Herbert Goss, who died in February.

Mr. E. Jacob, of York, draws attention (in 'Country Side'), to the fact that 'From the list of the British Association's report of butterflies occurring in the vicinity of York, it appears that quite half-a-dozen species have been exterminated in that locality of late years, and among them the marbled white, formerly plentiful within ten miles, the large tortoiseshell, two species of fritillary, silver-studded blue, the wall butterfly, and the speckled wood, besides the comma, which is now extremely rare.'

A new monthly 'Natural History' Magazine made its appearance on All Fool's Day. It speaks very largely of the weekly paper, to which it owes its origin, and which, is it possible, it may some day supercede? The most prominent items are the advertisements, which refer to hats, pure milk for babies, face-cream, soap, dog mixture, chicken meal, weeding lawns, tea, coffee, cocoa, mineral waters, and other appropriate subjects. In fact, the 'Natural History' flavour of the advertisements may be taken as an index of the kind of 'natural history' in the new publication. There appears to be a medical page, a cookery page, a gardening page, a live-stock page, etc., and we observe that the word 'mammal,' to which the weekly father of this weakly child took so deep an objection, is here used with impunity. Amongst the articles we notice such absorbing and scientific topics as 'The great Cuckoo problem'; 'Do Mummy Seeds Germinate?'; 'Water finding with a twig'; 'Village sayings'; 'Cats I have known'; 'Flowers in Egypt,' etc., etc. An early article, of course, deals with 'Ourselves.' In this we learn that '*Painstaking observers of nature* have not, as a rule, any itching for publicity; and of no branch of human knowledge can it be truly said than of nature-lore in Britain that "those who write do not know, and those who know do not write!"' That is worth reading a second time! And what do we find? The first article in the book is written by 'E. K. R.' A few pages further on and the same individual writes on 'The Meanings of Markings,' and there are a dozen or so of the familiar irritating, and at times quite unnecessary notes, in square brackets, under the signature 'Ed.' There are, in addition to all these, other parts, anonymously written, which appear to have the 'style' of the same —shall we say 'Painstaking observer of Nature'—or are we to accept the dictum of 'Ourselves,' and assume that 'those who write do not know'? No, the new Magazine will *not* kill all the natural history, botanical, zoological, horticultural, medical, culinary, farming, and advertising journals at present existing. But what about the 'weakly weekly'?

PREHISTORIC REMAINS FROM LINCOLNSHIRE.

T. SHEPPARD, F.G.S., F.S.A.Scot.

Referring to the notes in 'The Naturalist' for April, the following illustration represents two further specimens from Lincolnshire which are in our collection. From the somewhat peculiar nature of the patina, or oxide, on the bronze axes, I should say that they had been buried in a bed of peat or some similar deposit. They were both found together, and were presented to this Institution by Mr. T. W. Fullam some years ago. They are part of a hoard found in Lincolnshire, and are queried as from Winteringham. The nature of the patina, however, is totally different from that exhibited on the Winteringham specimen (fig. 14 on p. 138 of the April 'Naturalist').

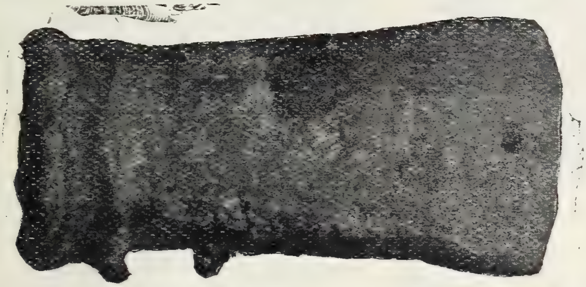


Fig. 15.

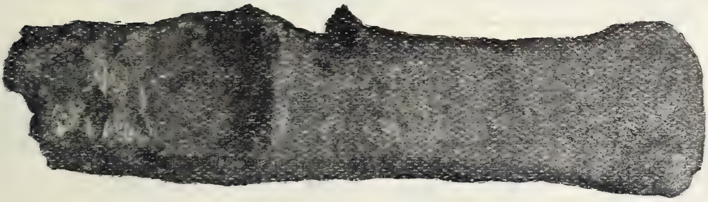


Fig. 16.

The example shewn in fig. 15 is a socketed axe, somewhat similar to the specimen already referred to (fig. 14), but it is rather longer, and has a medial ridge extending from the collar towards the cutting edge, though the precise length of this is not clear on account of the thick coating of patina. The axe is 3⅜ inches in length, 1½ inches across the top, and has a cutting edge 1⅝ inches long. There is a well-defined ridge at a distance of half an inch from the opening, from which the upper part of the loop springs. In this axe, however, as in the next example, the loop has been broken away. The opening for the shaft is roughly square, and inside the axe is a ridge running along on the two sides, corresponding with the ridges on the outside. At the sides of the axe the lines showing the joints of the mould are clearly visible. The weight is seven ounces.

The second specimen (fig. 16), is of the massive palstave type, not unlike fig. 13 (p. 138). In this case the specimen appears to have been imperfectly cast, and there are a number of cavities in the bronze in the upper portion, and in the vicinity of the loop the metal appears to be very impure. In fact, it is probable that the loop has never been cast at all in this instance. The ' business ' end of the axe is rather clumsy, and the cutting edge has not been hammered out. On one side the line formed by the junction of the two halves of the mould is shown, but on the other it has been filed away. The length of this axe is 4½ inches, it is almost an inch wide, and the cutting edge is slightly longer than an inch. The depressions for the split shaft are an inch and a half in length from the top of the axe, and about a quarter of an inch in diameter. The weight of this specimen is 8½ ounces.

In connection with these two axes it seems pretty obvious that they are part of a founder's hoard, and represent imperfect axes which were probably again intended for the melting-pot, and not for use. Their somewhat irregular shape, the flaws on one of the examples, and the fact that their cutting edges have not been hammered out, tend to confirm this opinion.

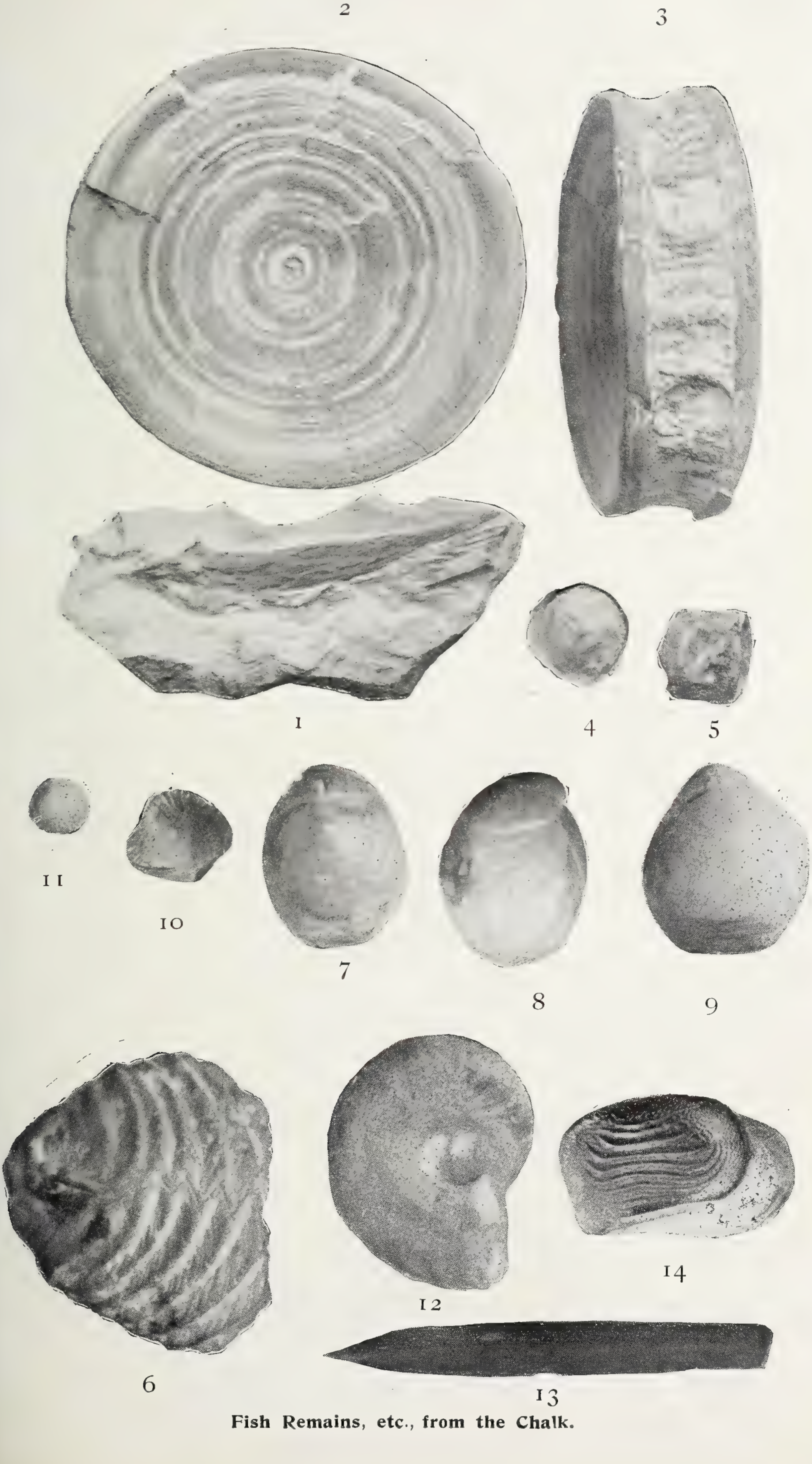
◆

The East Riding County Council has made a grant of £10 to the East Riding Nature Study Association—an Association of teachers.

In the ' Irish Naturalist ' for April, Dr. R. F. Scharff gives particulars of an unsuccessful attempt he has made to readily determine the sex in woodcock.

Mr. E. W. Wade writes an interesting paper on ' The breeding habits of the Common Bittern ' : a result of his observations in Holland, in ' British Birds ' for April. In the same issue Messrs. Witherby and Ticehurst refer to the spread of the Little Owl from the chief centres of introduction.

The gold medal of the Royal Society for the Protection of Birds (Great Britain) and twenty guineas are offered for the best Essay or Treatise on ' Comparative Legislation for the Protection of Birds.' Essays, which may be written in either English, French, or German, should consist of not fewer than 10,000 nor more than 25,000 words. Further particulars can be obtained from the Secretary of the Society, 3 Hanover Square, London, W.



Fish Remains, etc., from the Chalk.

BRITISH MUSEUM NATURAL HISTORY

FISH AND OTHER REMAINS FROM THE CHALK OF LINCOLNSHIRE AND YORKSHIRE.

(PLATE XVI.).

T. SHEPPARD. F.G.S.,
Hull.

SOME discoveries have recently been made in the chalk of North Lincolnshire and East Yorkshire, which it is advisable to place on record.

The well-known chalk quarries at Barton and South Ferriby have yielded a number of interesting fish and other remains, some of which have not previously been recorded for the chalk of this district. The specimens include remains of Ganoid and Teleostean fishes (enamelled-scaled fishes and bony fishes respectively), as well as of Selachians (sharks).

Perhaps one of the most interesting discoveries is the fin spine of a Ganoid, probably referable to *Lepidotus*. The specimen (Plate XIX., fig. 1) is three inches in length, and shows the part of attachment to the remainder of the skeleton. It was obtained by Mr. H. C. Drake, F.G.S., in the lower part of the Middle Chalk (a few inches above the 'Black Band' or *Belemnitella-plena* zone), in the well-known chalk pit at South Ferriby. *Lepidotus* is a well-known Jurassic type of fish, which survived into Cretaceous times, and appears to have become extinct in the Upper Cretaceous beds. The specimen from South Ferriby, which is a new record for the Chalk of the north of England, is from one of the highest horizons on record, and is therefore quite possibly a relic of one of the last individuals of its race that existed on this globe.

Another interesting find in the same quarry was made on a joint excursion of the Hull Scientific and Field Naturalists' Club and the Hull Geological Society last year. The foreman in the quarry had kindly put on one side a number of unusually large vertebræ, and we were informed of the position in which they had been obtained.

This proved to be in the lower two or three inches of the *B. plena* zone, opposite the entrance to the quarry, and at this point the bed is eight or ten feet from the pit floor. The fossils were practically resting upon the uppermost bed of the Lower Chalk.

By carefully removing some of the marly material, we were fortunate enough to secure other vertebræ, and were thus able to definitely locate the exact horizon at which the remains were found. Some of the bones were slightly crushed and in pieces, but a few were in very excellent condition. In all, remains of eight or ten vertebræ were secured, four of which are practically complete.

As will be seen from the illustrations (figs. 2 and 3), these are nearly circular, and amphicœlous, that is to say, they are hollow on both sides. They average 2½ inches in diameter, and three-quarters of an inch in thickness; the largest, however, being three inches in diameter. These vertebræ belong to a species of *Lamna*, a shark, the teeth of which are not uncommon in the same beds, and are known to the quarrymen as 'fossil birds' tongues.'

In the adjoining Barton pit on the same excursion the members were particularly fortunate in securing quite a number of teeth of *Lamna* in the marls of the 'Black Band,' a fine specimen being given to us by Mr. J. W. Stather, F.G.S. Other specimens from the same pit were obtained by Mr. T. Stainforth.

From this quarry Mr. Drake obtained eight small vertebræ (figs. 4 and 5), three being in juxta-position. These belong to an altogether different type of fish, namely, *Elopopsis crassus*—A. S. Woodward. Specimens of this form were described by Dr. A. S. Woodward in the 'Proceedings of the Zoological Society of London' for 1894.* Dr. Woodward's specimen was from Kent. The greater part of a skeleton of the same species was also described by Dr. Woodward in the 'Naturalist' for September 1907, p. 306. These specimens are slightly crushed, and are half an inch in diameter and about the same in thickness.

From the Upper Chalk at Sewerby (near Bridlington) in the horizon of the well-known sponge bed, I last summer obtained two small vertebræ which seem to be very similar in size, etc., to the specimens of *Elopopsis crassus* just described.

Dr. A. W. Rowe also records fish remains on this horizon (see 'Proceedings of the Geological Association,' Vol. 18, p. 296).

Some little time ago I obtained from the marls of the *B. plena* zone at South Ferriby, the very distinct impression of what appears to be the beak of a Cephalopod, and Dr. G. C. Crick, of the British Museum, agrees with this opinion. Impressions of the beak occur on the sides of the split piece of shale, and at Dr. Crick's request one half has been presented to the Natural History Museum. The other portion is in our own collection.

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* Published 1895, p. 659, plate 43, fig. 1.

From the Red Chalk at Speeton we have the greater portion of an unusually large shark vertebra, similiar to those shown in figs. 2 and 3. The diameter of this specimen is 5¼ inches. It was formerly in the possession of the late G. Lether.

The various specimens referred to above are in the geological gallery at the Hull Museum, thanks to the kindness of Mr. Drake, and I am also indebted to Dr. Smith Woodward for kindly examining and identifying them.

Other specimens which ought to be recorded are in the Mortimer Museum, at Driffield, and Mr. Mortimer kindly allowed me to have the loan of some of these for a short time. They consist of a number of large and small vertebræ from the Red Chalk at Speeton. They have been examined by Dr. Smith Woodward, who reports that most of them belong to a *Lamna* of some kind, whilst one small one is of the Teleostean, *Pachyrhizodus*. Mr. Mortimer's specimens have been returned to him, and can be seen in the Museum at Driffield.

Another fossil which does not appear to have been previously found in the chalk of this district, is shewn in fig. 6. I obtained it many years ago in the beds of Lower Chalk exposed on the foreshore at South Ferriby, near the jetty at the chalk pit. At that time I considered the fossil to be a small portion of a large bivalve. Recent examination, however, and comparison with other specimens, shew it to be a good and almost perfect example of Ostrea. Dr. Smith Woodward informs me that it is *Alectryonia Ricordeana* (Orbigny) Coquana (= *Ostrea carinata* Sowerby). This species does not appear to have previously been recorded for the chalk of Lincolnshire, and I can find no reference to its occurrence in Yorkshire.

With fig. 6 are shewn a few other typical North Lincolnshire chalk fossils, all from South Ferriby. Figs. 7, 8, and 9, are examples of the lampshell, *Terebratula semiglobosa*, a fairly common fossil. Other brachiopods are shewn in figs. 10 and 11. The former is a full-grown and the latter is a young specimen of *Rhynchonella cuvieri*.

Fig. 12 represents a small ribbed *Ammonite* (*Puzosia*) found on the foreshore near to where the Ostrea (fig. 6) was obtained.

Fig. 13 is a representation of *Belemnitella plena*, the characteristic fossil of the 'Black Band,' at the top of the Lower Chalk.

A palate tooth of *Ptychodus polygyrus* is shewn in fig. 14.

1908 May 1.

DATES OF PUBLICATION.

F. A. BATHER, D.Sc., F.G.S.

WITH sad surprise I have read a letter in your issue of April, signed by Dr. A. R. Dwerryhouse, Editor of the 'Proceedings of the Yorkshire Geological Society.'

Two years ago I had a lengthy correspondence on this very subject with the Rev. W. Lower Carter, who preceded Dr. Dwerryhouse in the editorship, and I deeply regret to find that the arguments and authorities which I brought to bear on the then Editor of the 'Proceedings' have had no effect on his successor. I had previously thought of communicating privately with Dr. Dwerryhouse, but now that the question has been publicly raised in your pages, perhaps you will kindly permit me a few observations, to which I beg the serious attention of Dr. Dwerryhouse and any other editors who may possibly share his opinions.

The difference between yourselves and Dr. Dwerryhouse seems to depend on different interpretations of the word 'date.' It is by no means clear to the uninitiated reader what is intended by the date 1907 appearing on the outer wrapper of the last number of the 'Proceedings of the Yorkshire Geological Society.' Such a date may be intended for one of three things: first, the actual date of publication; second, a date equivalent to or replacing the usual volume number—a conception for which we have no definite word in England, but which is well rendered by the German 'Jahrgang'; third, a date indicating that the contents of the volume deal with a period covered by the date. Now you in your criticism apparently take the date appearing on the wrapper of the part in question to be the first of these, in other words, the date of publication; and quite correctly you point out that it is *not* the date of publication, since, as Dr. Dwerryhouse admits, the part was not issued before the second week of January 1908. Dr Dwerryhouse, on the other hand, interprets the date 1907 in the third sense; and, as he is the editor who placed the date there, we must accept his interpretation.

It does not follow from the preceding remarks that Dr. Dwerryhouse is altogether in the right, for the part in question contains nearly as much matter referring to 1906 as it does of matter referring to 1907. Clearly, then, Dr. Dwerryhouse should have put on the outside wrapper '1906 and 1907.' So far as this is concerned, he may be left to the reproaches of his own conscience; the omission is not one of very general interest. We pass to the question that really is of importance to all workers in the branches of science with which you deal.

Conceding to Dr. Dwerryhouse the interpretation which he gives, and overlooking his own inconsistency, the fact remains that *the part in question bears no date of publication whatever.*

In July 1896, a circular was issued by a Committee of the British Association, which I had the honour to serve as Secretary, saying *inter alia* that 'it is the general opinion of scientific workers . . . . that each part of a serial publication should have the date of actual publication, as near as may be, printed on the wrapper.' (It may be mentioned that more than one copy of this circular has been addressed to the Editor of the Yorkshire Geological Society). What was the general opinion in 1896 had become, one hoped, the universal opinion of scientific workers in these days of bibliographies and international catalogues. One regrets, however, to observe that there are still a few exceptions, though it is not often that any is found bold enough to defend his anomalous position in public. Let us briefly examine the arguments for that position.

I have not received permission to publish the considerations addressed to me by Mr. Lower Carter, nor can I be certain that Dr. Dwerryhouse is in entire agreement therewith; but to judge from what has been published by the latter gentleman, it appears that he would consider the date of reading a paper to be of more importance than the date of its publication. From the point of view of the individual author, that date, or better still, the date on which his MS. was sent in to the Secretary of the Society, has no doubt a predominant importance, as proving that he has not cribbed his matter from a paper that may have been published before his, but at a later date than the sending in of his MS. Since this seems to be the point of view most sympathised with by Dr. Dwerryhouse, it is curious that he should have omitted to give the date of reading in the case of all but one of the six papers contained in the part for which he is responsible. It is true that a prolonged search through the 'Proceedings of the Yorkshire Geological Society' has enabled me to attach dates of reading to two more, but we have not all the time to give to this fascinating study, nor indeed is the question of the slightest importance to anyone beyond the original author and his hypothetical plagiarist.

1908 May 1.

The one date that is of interest to other scientific workers is the date of publication. By this is meant the date on which any work is first obtainable by purchase in the usual way; or, in certain cases, the earliest date of gratis distribution to any member of the public. Private distribution is not publication. In every case this date of publication must affect more people than does the date of reading; but in the case of some works, the suppression of this date need cause no great inconvenience, except to bibliographers, historians, and plagiarists real or alleged. It is in the case of work involving the giving of new names that the real importance of the date of publication first appears. All such names, whether zoological, botanical, stratigraphical, petrographical, mineralogical, or chemical, are now-a-days selected for use according to their priority; and this priority is decided by the year, month, day, or even, it may be, the hour of publication as defined above. With the modern increase of scientific work and publication, there is also an increased probability that two authors may independently but synchronously propose the same name for different things, or call the same thing by different names. No serious student needs to be reminded of the appalling confusion and waste of time caused by these coincidences. Such accidents must always be happening, but we can reduce, if not entirely do away with, their evil effects by issuing no volume, part, or paper, without the correct date of publication printed on it, by repeating the same date on all reprints, and by quoting it in our bibliographies. That there need be no difficulty about this, even in the case of the Yorkshire Geological Society, is proved by the fact that Mr. Carter yielded to my pressure so far as to have printed on page 3 of the wrapper of the last number of the 'Proceedings' issued by him, the words 'Published February 14th, 1907.' This was not ideal, since a careless binder or an incompetent librarian could destroy the wrapper, but it was a step in the right direction, and did so far serve the cause of priority. If Dr. Dwerryhouse still 'fails to see' how it did so, perhaps he might look at Mr. C. D. Sherborn's 'Notes on Bibliography, &c.' in the January number of 'The Naturalist.' But, at the risk of excessive length, I have tried to make this letter clear, and I hope all Editors and Publishers will understand that it is not an expression of my private opinion alone, but of that of eminent naturalists in all parts of the world, and indeed of the large majority of scientific workers.

FIELD NOTES.

HYMENOPTERA.

***Mutilla europæa* in Yorkshire.**—I have pleasure in recording at the finder's request, the third occurrence of the Solitary Ant (*Mutilla europæa*) in Yorkshire. It was taken by Dr. J. W. Fordham, of Sheffield, in August 1905, on the moors above the Peak Alum Quarries at Robin Hood's Bay. As in the two previous cases, the specimen is a female.—FRANK ELGEE, Middlesbrough.

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MOSSES.

Mosses from Caudley, West Yorkshire.—During the Christmas holidays, 1907, I spent a few days in the Cautley district with Mr. H. Foster. Amongst the many interesting mosses we saw were the following, which I think have not been recorded from there previously :—*Dicranella secunda* Lindb., Cautley Spout. This seem to be an addition to West Yorkshire mosses. Mr. W. Ingham, who has verified this and many of the following, says it comes near to the sub-species *D. curvata* Schp. ; *Oligotrichum hercynicum* Lam., Cautley Spout ; *Fissidens osmundoides* Hedw., Cautley Spout ; *Fissidens decipiens* De Not., Cautley Spout ; *Grimmia conferta* Funck., Cautley Spout ; *Barbula rubella* mitt. var. *ruberrima* Ferg., Cautley Spout ; *Webera cruda* Schwæg., cfr., Cautley Spout ; *Antitrichia curtipendula* Brid., Cautley ; *Plagiothecium pulchellum* B. & S., Cautley Spout ; *Hypnum scorpioides* L., Blue Caster Fell; *Hypnum giganteum* Schp., Blue Caster Fell ; *Hypnum sarmentosum* Wahl., Blue Caster Fell.—CHRIS. A. CHEETHAM, Armley.

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COLEOPTERA.

***Tachinus proximus* Kr. and *Philonthus debilis* Gr. in Yorkshire.**—Having met with *Tachinus pallipes* Gr. on one or two occasions in the Saltburn district, I have been much interested to find that another northern species of this genus occurs in Yorkshire. I took two specimens of *Tachinus proximus* Kr. from decaying fungi in a plantation just below Stanghow Moor, near Saltburn, in September 1905. This is an elevated locality, such as its inclusion in the Northumberland catalogue by Bold indicates the species to inhabit. James Hardy found it in the Cheviot district in 1871. I also took

Philonthus debilis Gr. in a dead bird on the coast at Saltburn, in 1906. This is not a rare species, and has probably been overlooked in Yorkshire, some of the smaller *Philonthi* being very closely allied, and rather difficult to determine. I am indebted to Mr. G. C. Champion for kindly examining the above insects, and settling my doubts respecting them.—M. Lawson Thompson, Saltburn-by-the-Sea.

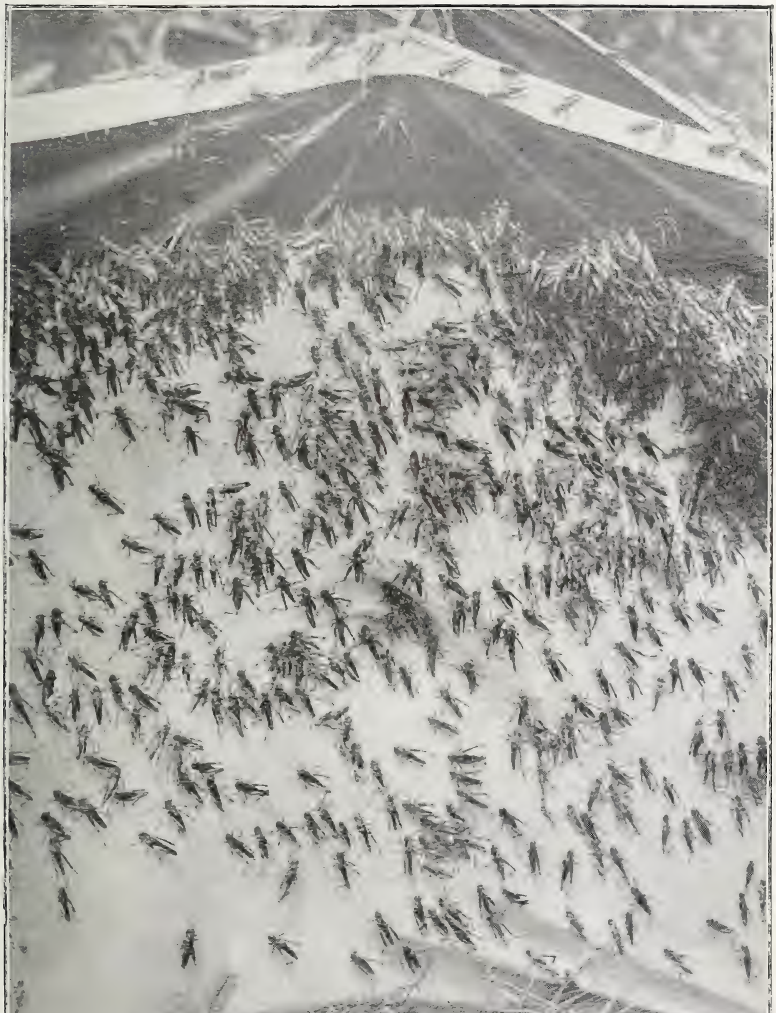
REVIEWS AND BOOK NOTICES.

A Guide to the Exhibited Series of Insects, British Museum, Natural History, Zoological Department, Insect Section, 1908. 60 pp., 1/-

The authorities of the Natural History Museum, South Kensington, are to be congratulated upon the frequency with which these guides to the special departments are being produced. The present volume has a prefatory note by Mr. C. O. Waterhouse, and is about as concise a description of the various orders of insects as could be well wished. After giving some remarks on the general arrangement of the gallery, and a most useful chapter on the structure and classification of insects, the various orders are dealt with, including Aptera, Orthoptera, Neuroptera, Trichoptera, Mallophaga, Lepidoptera, Hymenoptera, Diptera, Coleoptera and Rhynchota. There are no fewer than sixty-two excellent illustrations, several being from photographs. One of these, shewing a portion of a swarm of locusts, the authorities kindly allaw us to reproduce (plate xvii).

Three Voyages of a Naturalist: being an account of many little-known islands in three oceans visited by the 'Valhalla' R.S.Y., by **M. J. Nicoll,** with an introduction by the Rt. Hon. The Earl of Crawford, K.T., F.R.S. Witherby & Co., 1908. 246 pp., price 7/6 net.

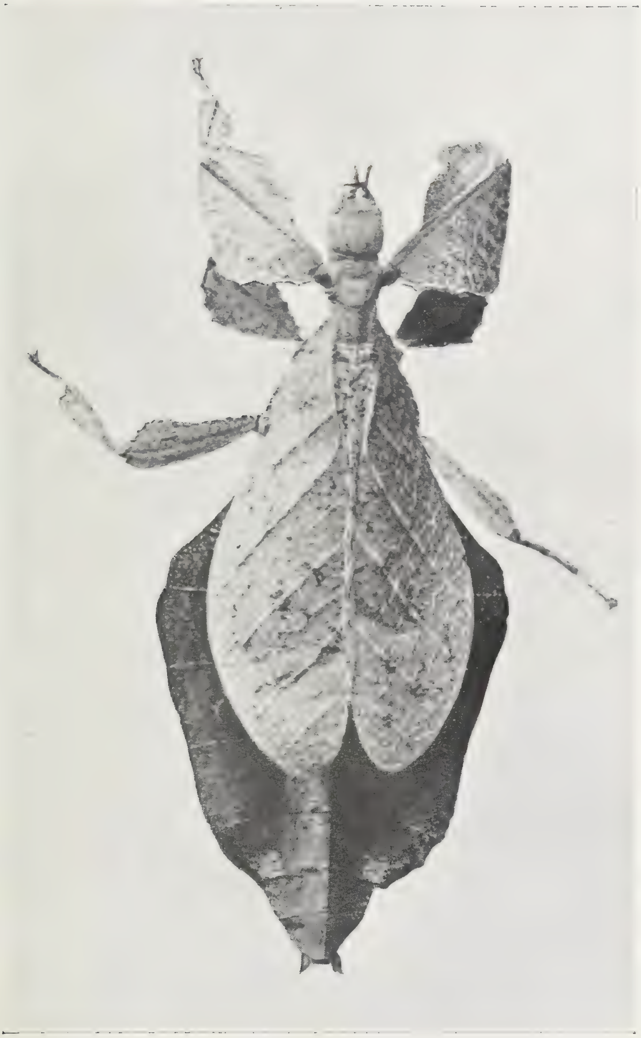
The Earl of Crawford informs us that he has 'two inseparable hangers-on—the one rheumatism, the other asthma.' For fifteen years he has found relief from these by spending his winters in the seas of the sunny south. At a suggestion of a brother trustee of the British Museum, he took Mr. M. Nicoll on three voyages, for the purpose of securing specimens for the national collection. The first voyage lasted eight months, during which over two hundred bird-skins, thirty mammals, a few hundred fishes and reptiles, and several hundred butterflies, moths, etc. were secured. The second voyage occupied five months, when a similar number of specimens was secured, including three birds new to science. The third voyage occupied seven months, and as Mr. Meade-Waldo was present on this occasion, and attended to the insects, Mr. Nicolls was able to devote more time to the vertebrates, and secured eight birds new to science, besides many rarities. During these voyages many interesting and rarely visited islands were investigated. The localities visited were the East coast of South America, through the Straits of Magellan up to Valparaiso, across the Southern Pacific Ocean. The West Indies, the Gulf of Mexico, the Southern Indian Ocean, etc., etc. were also seen, and the various interesting natural history facts ascertained are graphically enumerated. The volume takes the form of an entertaining narrative, in non-technical language, but is never- theless full of points of value to the naturalist, be he zoologist or botanist. It contains many useful observations in almost every branch of natural history, varying from the most reliable account of a huge marine monster—probably the origin of some of the sea-serpent stories, to the descriptions of the leaf-insect, examples of which have been reared by Mr. W. H. St. Quintin, from eggs laid by insects brought home from Seychelles. An illustration of one of these we are kindly permitted to reproduce (plate xviii.). The book is suitably produced, and is illustrated by fifty-six plates, as well as other illustrations.



Photograph of a small portion of a swarm of Locusts (*Acridium peregrinum*), shewing a method of trapping them.

($\frac{1}{14}$ nat. size).

BRITISH MUSEUM NATURAL HISTORY



Female Leaf=Insect from the Seychelles.

BRITISH MUSEUM NATURAL HISTORY

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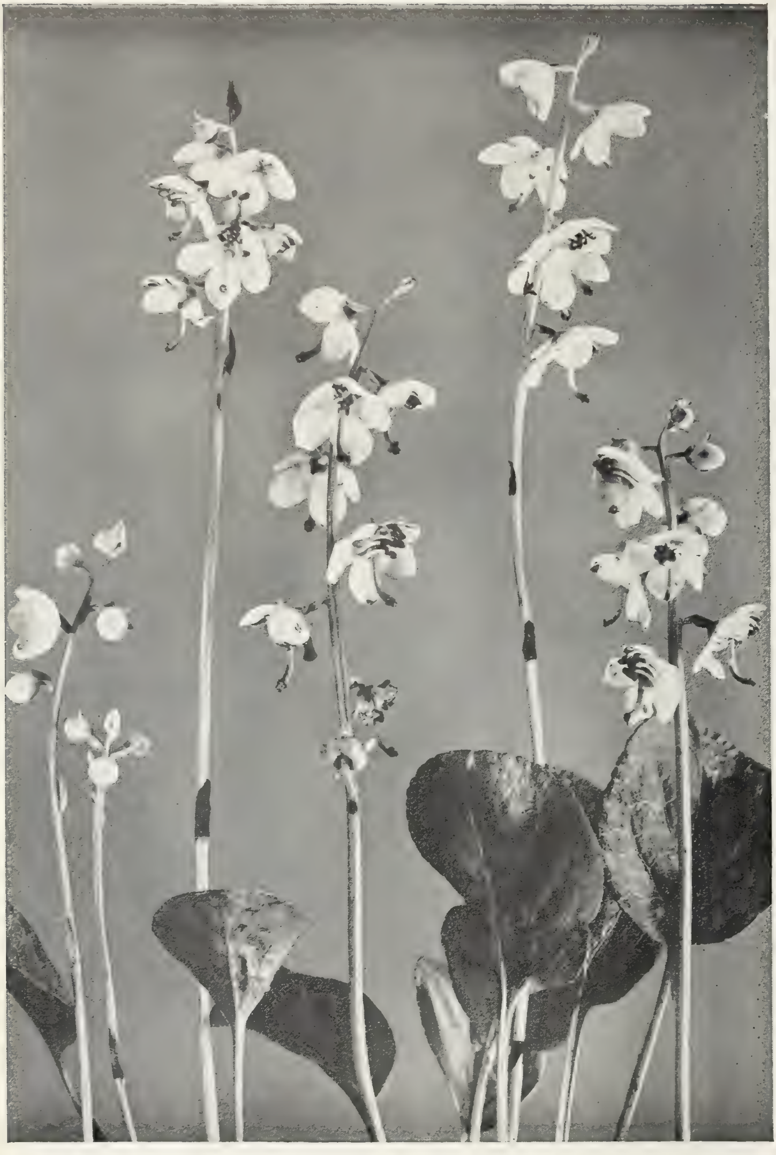

E. Connold]. [*Photo*

The Larger Wintergreen, *Pyrola rotundifolia* L., nearly natural size.

A number of interesting Annual Reports have been sent to us. The Recorder's Reports (Natural History Section of the **Hebden Bridge Literary and Scientific Society**), presented at the last annual meeting, have been printed as a pamphlet. They form a useful record, and we notice that the recorders make good use of 'The Naturalist.' The reports are—Ornithology, by W. Greaves; General Botany, by W. Nowell; Fungi and Hepatics, by J. Needham; Geology, by J. H. Greenwood; and Entomology, by E. B. Gibson.

The seventy-fourth annual report of **Bootham School** (York), Natural History, [etc.] Society, contains a record of an encouraging year's work, and it is pleasing to find that natural history plays a prominent part in the studies at this school. The reports are refreshing to read, and the writers do not 'mince matters.' One youth has worked 'with a remarkable mixture of energy and carelessness.' In some botanical specimens,' the abundance of sticking-plaster is deplored; it obscures the specimens, and makes each sheet look like a surgical map.' In Ornithology and Taxidermy 'E. B. Marriage takes first place, *his skulls and breast-bones being numerous!* A long way below came a few specimens of feet [surely their proper place!], and bracketed with the latter are W. E. J. Clothier's skulls, skins, etc.' With regard to one youth's collection of insects 'all criticism is merged in amazement at his spelling.' Under 'Oology' we notice 'first comes F. A. Brockbank, who has collected thirty-eight species, all this year [1907].' The recorder states 'it would be much better to have the localities and dates somehow attached to the eggs themselves,' in order to give the police every possible help, we presume!

The Hastings and East Sussex Naturalist (Vol. I., No. 3, price 2/-) is to hand. It is issued by the Hastings and St. Leonards Natural History Society, under the editorship of the Hon. Secretary, Mr. W. R. Butterfield. The items include 'The Mosses of Sussex,' by W. E. Nicholson; 'False-Scorpions of the Hastings District,' by W. R. Butterfield; 'The Sardinian Warbler in East Sussex' and 'The Heronry at Windmill Hill Place,' by T. Parkin; '*Tortrix pronubana* Hb. in Sussex, by A. Adkin; 'The Larger Wintergreen near Hastings,' by E. Connold; and 'Notes on the local Fauna, Flora, etc.,' by the Rev. E. N. Bloomfield. There are also shorter notes, and six excellent plates, one of which the author kindly enables us to reproduce (plate xix.). The society is to be congratulated upon the valuable and strictly local nature of its publication, as well as upon the care with which it has been produced.

A Book of Birds, by **W. P. Pycraft, A.L.S., F.Z.S.** S. Appleton, 1908. 155 pp., price 6/- net.

This is a companion volume to 'Mammals of the World,' which was noticed in these pages for December last (pp. 434-5). The remarks then made as to the excellence of the volume also apply in the present instance. Mr. Pycraft has a pleasant style, and what he has to say is reliable, and not of the nature of the average book on birds—scores of which are now being placed on the market.

His first paragraph puts forward a view of the importance of the study of ornithology, which is very original. The twenty-seven pages of 'Introductory' form the most concise description of the structure and habits of birds that we remember to have read anywhere. Mr. Pycraft wisely refers to the principal groups of birds only, and does not occupy space by descriptions of the less known species. He points out that there are in all some 14,000 species of birds known, and to have enumerated all in this volume would have meant that the description of each species would have been confined to four words. And even Mr. Pycraft, with all his reputation for concise description, would find a difficulty there! There are thirty coloured plates, as well as illustrations in the text, and we are pleased to find a remarkably good index.

NORTHERN NEWS.

Under the name '*Agriolimax lævis* var. nov. *nigra* Rbk,' Mr. W. Denison Roebuck describes a melanic form of the Marsh Slug, from the Orkneys.

'The — — occupies among nature lovers,' we read in a weekly paper, 'somewhat the position *Truth* does among other people.'—*Somewhat*, and *Truth* are good !

The Secretary of the Victoria Institute is circularising likely people to become members of the Institute. We notice that 'it is to be understood that only such as are professedly Christians are entitled to become members.'

We understand from the 'Manchester Evening News' that 'by means of geological specimens and shells, elementary botany is taught.' Respecting this, 'Punch' adds 'and, *vice versa*, a primrose by the river's brim was just geology to him, and it was nothing more.'

Mr. E. A. Newbery records '*Meligethes viduatus*, Sturm, var. *æstimabilis*, Reitt., an addition to the British list of Coleoptera,' in the April 'Entomologist's Monthly Magazine.' The specimens were found by Mr. F. H. Day, in Cumberland. From the same county, Mr. Day describes an unrecorded form of *Laccobius nigriceps*, Th.

The Chester Town Council have adopted a scheme for the municipalisation of the well-known Grosvenor Museum, which should now prove even more useful than has been possible in the past. Similarly, at Ilkley, we are glad to learn from the 'Museums' Journal,' that specimens in the old museum are to be taken care of by the town, and will be better housed and displayed.

We understand that the late Henry Clifton Sorby has made provision for the endowment of a Chair of Geology at the University of Sheffield. In addition he has bequeathed to the citizens of Sheffield his large series of animals and the marine algæ mounted as lantern slides illustrative of the natural history of Kent, Essex, and Suffolk, and such of his gold medals, pictures, prints, drawings, framed photographs, works of art, china, silver plate, natural history specimens, and preparations as the Corporation of Sheffield may consider suitable for a public art gallery and museum.

The Dublin meeting of the British Association will be held on September 2–9, under the presidency of Mr. Francis Darwin, F.R.S. The sectional presidents are as follows :—*A*, Dr. W. N. Shaw, F.R.S. ; *B*, Prof. F. S. Kippling, F.R.S. ; *C*, Prof. J. Joly, F.R.S. ; *D*, Dr. S. F. Harmer, F.R.S. ; *E*, Major E. H. Hills, C.M.G. ; *F*, Lord Brassey, K.C.B. ; *G*, Mr. Dugald Clerk ; *H*, Prof. W. Ridgeway ; *I*, Dr. J. S. Haldane ; *K*, Dr. F. F. Blackman, F.R.S. ; *L*, Prof. L. C. Miall, F.R.S. There will also be a subsection of Section *F*, to be concerned with agriculture, and the Chairman will be Sir Horace Plunkett, K.C.V.O., F.R.S.

The members of the Yorkshire Geological Society had a pleasant excursion in the Oswestry district during the Easter holidays. The first day the excursion, according to the official programme, was to Glyn Ceiriog, Selattyn, and Cae Deicws, and they examined the igneous rocks about Llanarmon. On the second day they went to Llanrhaiadr, Pistyll Rhaiadr, Llyn-llyn Caws, Cader Berwyn, and Craig-y-Glyn. On the following day they saw Carreg-y-big, and examined the Cefn-y-fedw sandstone, and also visited Maes-y-Craig, Llawnt, Glascoed, Pant hir, Treflach Wood, and Nant Mawr. They next went to Llanymynech, Llanyblodwell and Porth-y-Waen, and on the last day saw the Eglwyseg rocks in the Bronheulog Quarry, and walked over the Cefn-y-fedw series. After that they returned home, and cooled their swollen tongues in ice, etc. One geologist was noticed to have labelled his luggage for 'Rhaiandr-Rhwd, Llwds' ; and another was for 'Burkynhwdd, Llywrpwll' !

BRITISH MUSEUM NATURAL HISTORY
9 MAY. 1908

An Advantageous Offer to readers of 'The Naturalist' and their friends.

THE FAMOUS NATURALIST-LECTURER,

Mr. Richard Kearton, F.Z.S.,

Writing in the 'Daily Chronicle,' says :—

'In his preface the author claims that this work is based upon an unrivalled and exceptionally complete mass of material, that it is comprehensive in scope, and that the account of each species dealt with in its pages includes particulars of faunistic position, distribution, migration, nidification, folk-lore, varieties and vernacular names. This bold claim is thoroughly justified. Having been born and brought up amongst the birds in one of the wildest parts of the 'County of Broad Acres,' I felt myself more or less qualified to test the accuracy of the author's statement when his two handsome volumes came into my possession, and I am bound to confess that he does not in the least overstate the claims of the work. I have again and again put its accuracy and fulness to the severest of tests, and in each instance it has come out triumphant.

'Mr. Nelson and his literary and pictorial helpers have placed all British ornithologists under a deep debt of gratitude by the production of one of the best and completest county histories of birds ever published.'

The above is the opinion of a competent authority, and relates to

The Birds of Yorkshire

A Historical Account of the Avi-Fauna of the County,

BY T. H. NELSON, M.B.O.U.,

With the co-operation of W. EAGLE CLARKE, F.R.S.E., F.L.S., and F. BOYES.

IN TWO VOLUMES.

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THE MUSEUM, HULL;
AND
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TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
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NOTES AND COMMENTS.

WHITBY JET.

In an interesting paper appearing in 'The Quarry,' by Messrs. A. Greenwell and J. V. Elsden, we find under the heading 'Jet,' that 'small and variable quantities of jet are obtained from the Upper Lias formation of Yorkshire, in the neighbourhood of Whitby. It is a compact variety of lignite, occurring in the shales, and is occasionally thrown up on the shore during rough weather. There are no regular workings, the farm labourers filling in their leisure time by burrowing for the mineral at odd times. The production is rapidly declining. In 1886, 4670 ℔. of jet, valued at £934, were produced, but in 1897 the amount had fallen to 84 ℔., valued at £8. Since 1897 no jet appears to have been obtained.

THE SMITHSONIAN INSTITUTION.

The Smithsonian Institution, Washington, still places scientific workers in various parts of the world under a deep debt of gratitude for the excellent and generous way in which it puts before them the latest details of important discoveries. No institution in Britain or her colonies, nor indeed anywhere, private, or under Government control, accomplishes as much in the furtherance of science, as does this excellent American National Institution. Its publications deal with the most recent researches in almost every branch of science, and these are published in a way which excite the envy of British Institutions, be they National or Municipal. To our disgrace also be it said, the Smithsonian Institute has published the work of Englishmen, which has been carried out in England, and has then generously distributed the publications amongst the institutions in this country which should have done the work at their own cost.

THE MAMMOTH.

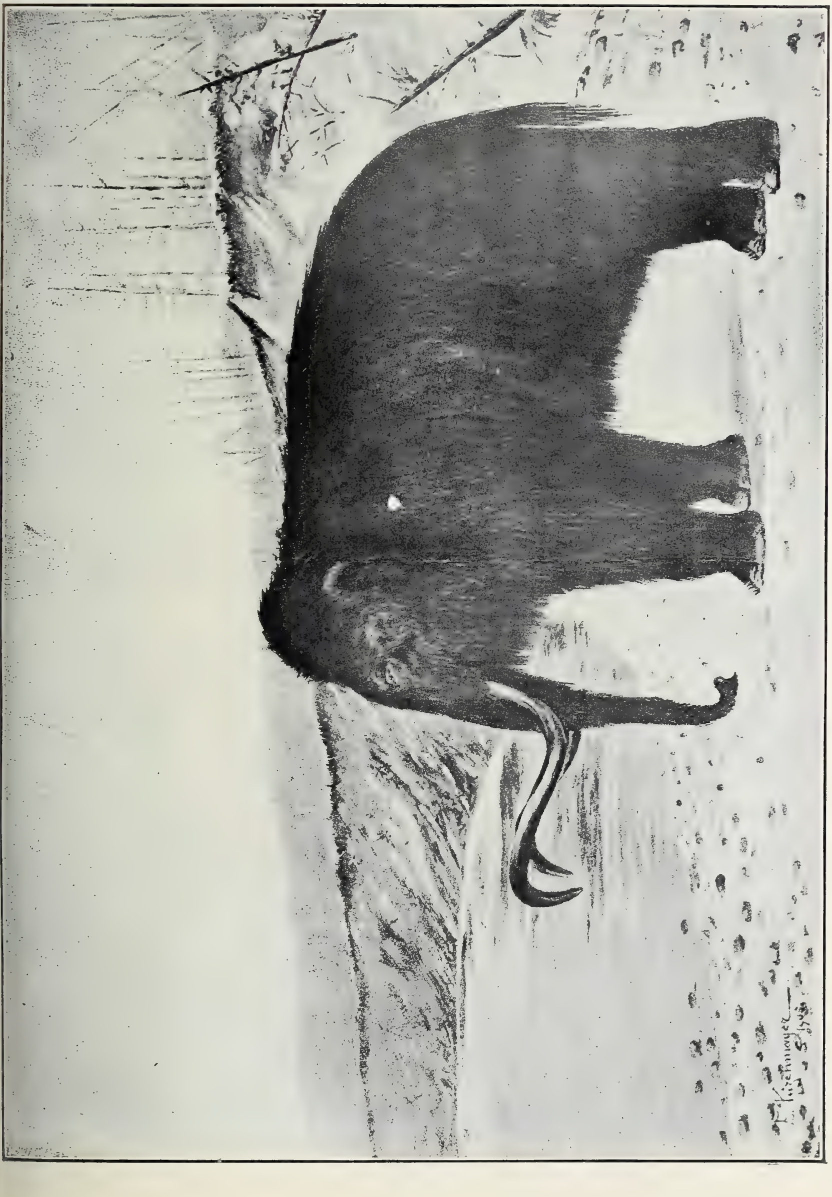
In the Annual report of the Smithsonian Institution for 1906,* just to hand, besides an account of the year's work of the Institution, there are several important monographs by various specialists. Amongst many items there is a paper on 'Recent Advances in Wireless Telegraphy,' by Mr. G. Marconi. Dr. C. W. Andrews, of the British Museum, writes on 'The Recently Discovered Tertiary Vertebrata of Egypt,' and Mr. E. Pfizenmayer has a valuable contribution on 'The Morphology of the Mammoth.' In this last, the author has had the advantage of a personal inspection of the specimen found on the Beresovka River. The hairy covering of the Mammoth had a close resemblance to that of the Musk Ox. The tail was comparatively short, but it is with regard to the precise position of the curiously curved tusks that the author strikes out a particularly new line. He suggests that the points of these were directed downwards, and were probably used as digging instruments in the same way as the 'snow-scraper' of the Reindeer. This does not quite agree with the position of the tusks in the well-known Adam's mammoth in the St. Petersburg Museum, but, as the author points out, the tusks of that specimen are made up of pieces of two or three different ones, joined together! By the courtesy of Prof. Pfizenmayer, and with the permission of the Smithsonian Institution, we shall next month be able to reproduce the remarkable restoration of the Mammoth for the benefit of our readers (plate xx.).

---

* Washington, Government Printing Office, 546 pp. and plates.

DARWIN'S LIBRARY.

It is always interesting to examine the library of any worker, no matter in what direction his work lies. To readers of this journal perhaps none would appeal more strongly than that of Charles Darwin. A catalogue of this library, which is under the charge of Professor Seward of Cambridge, has recently been issued by the Cambridge University Press at the nominal charge of 1/-. It has been compiled by Mr. H. W. Rutherford, and contains an introduction by Mr. Francis Darwin. The library "retains to a great degree the original ragged appearance." Darwin hardly ever had a book bound, and he certainly *used* his books. A copy of the sixth edition of Lyell's 'Elements,' which was found too heavy to be read with ease, was simply cut in two. The general characteristic of the library is its incompleteness, hardly any of the sets of the periodicals being perfect. But it is certainly very valuable in many ways. The books indicate the extent to which they were read by the numerous pencil notes written on the pages, and by the loose scraps of paper pinned at the ends of the volumes. Cambridge is to be congratulated upon being the possessor of this collection, which will increase in interest and value as time goes on. The only small complaint we can make with regard to the catalogue is that there is no lettering on the back, so that when it is on the book-shelves it is liable to be overlooked or misplaced amongst numerous others, which unfortunately are similarly produced now-a-days.



The Mammoth, after Pfizenmayer. (See page 198).

BRITISH MUSEUM
NATURAL HISTORY

SOME HALIFAX BRAMBLES.

W. B. CRUMP, M.A,

INCIDENTALLY in the course of a detailed survey of the vegetation of Broadhead, or Bell Hole, near Mytholmroyd, I collected a number of specimens of fruticose brambles, both in 1905 and 1906. These I submitted for identification to the Rev. W. Moyle Rogers, who kindly named them. It seems desirable to publish the list now, as it may be some time before the main investigation is completed, and one or two of the brambles furnish new county records.

Broadhead is a small, round-headed valley, about a mile from Mytholmroyd, up Cragg Vale. Several head streams draining Erringden Moor meet in Broadhead, and owing to the prevalence of shales (of the Middle Grits) have formed a cirque-like depression. This is occupied either by a heath association of heather-bilberry-bracken, or by *Juncus* and *Sphagnum* swamps, or by birch scrub, or hawthorn scrub, or by oak-birch wood (Spring Wood). The 1000 feet contour line is the upward limit of the depression. Below about 550 feet, the stream course (Parrock Clough) is much like the usual type of clough, until in half a mile it joins Cragg Brook, near Dauber Bridge.

In the following list some attempt is made to indicate tentatively the actual associations to which the various species appear to belong, though wider experience may modify the conclusions. Any quotations are from the comments of Mr. Rogers, to whom I am much indebted, for without his aid, the list would not be in existence.

1.—*Rubus fissus* Lindb. A sub-erect bramble found in several places in the bracken, or bracken-bilberry area of Broadhead. In and about the *Juncus* swamp in Spring Wood ‘ a form with exceptionally small, narrow leaflets ’ is abundant.

2.—*Rubus plicatus* Wh. and N. In Spring Wood, dry area.

3.—*Rubus Lindleianus* Lees. On a bank, meadow-side, near Dauber Bridge.

4.—*Rubus rhamnifolius* Wh. & N. Only one example was gathered from the bilberry-heather association, which Rev. W. Moyle Rogers places under *R. rhamnifolius* Wh. & N. *sp. coll.*, and describes as ‘ a small form connecting type with sub-species *Bakeri* F. A. Lees.’

5.—*Rubus Bakeri* F. A. Lees. This sub-species though previously unrecorded from West Yorkshire (v. c. 63), is much commoner than the type, if typical *rhamnifolius* occurs at all. It occurs pretty frequently both in the bilberry-heather area and in the hawthorn scrub on the north slopes, showing a preference for the better drained sites.

6.—*Rubus Lindebergii* P. J. Muell. Broadhead, under bracken.

7.—*Rubus mercicus* Bagnall. In Rogers' 'Handbook of British Rubi' (1900), the only locality for this is Warwickshire, but its census number in the latest London Catalogue (1908) is 6. Its occurrence in Broadhead, as a member of the heather-bilberry-bracken association, constitutes a new Yorkshire record. It does not appear to be common, as I did not collect it again in 1906.

8.—*Rubus Sprengelii* Weihe. Appears to be well distributed on banks, lane-sides, and in the hawthorn scrub and birch scrub.

9.—*Rubus leucostachys* Schl. Of frequent occurrence: in pastures, on banks, in the hawthorn scrub, in Spring Wood, under bracken, etc.

10.—*Rubus podophyllus* P. J. Muell. Decidedly abundant, showing a preference for the wooded or scrubby areas. Thus it is found chiefly in and around Spring Wood and the Hawthorn scrub, or down in the various small gulleys. But it is also found occasionally in the more open heath land. 'Forms of *R. podophyllus* must' Mr. Rogers thinks, 'be singularly abundant in this district, and as bewildering in their great range of variations as usual.'

11.—*Rubus dasyphyllus* Rogers. In Parrock Clough at foot of wall along path side, and under a wall on edge of a heather-bilberry heath.

Nos. 1, 5, 6 and 7 are additions to the 'Flora of Halifax.'

◆

The 'Zoologist' for April this year contains 'Notes from Lakeland, Cumberland and Westmorland, 1905,' by T. C. Parker.

In 'Records of the Past' (Washington D. C.) for March-April, is reprinted, with additional illustrations, the account of the British Chariot-Burial at Hunmanby, which appeared in Hull Museum Publication, No. 47.

In the 'Mineralogical Magazine' for April, Prof. W. J. Lewis has a note on 'Some forms of calcite, and on a simple method of drawing crystals of calcite and other rhombohedral crystals, and of reducing the relations of their symbols.' It would be interesting to see a description of any other than a simple method!

MOSSES, Etc., AT HORTON-IN-RIBBLESDALE.

C. A. CHEETHAM.

HORTON-IN-RIBBLESDALE is an excellent centre for a bryologist. With such easy access to deep gills like Ling Gill, boggy swamps as Swarth Moor, and a mountain with the variety of rock that Pennyghent can offer, one has far more to do than can be crammed into a day or even a week-end. The district has been well worked, however, as the numerous records in our Flora, and the lists on an excursion circular issued last autumn by the Yorkshire Naturalists' Union show. In the present account the nomenclature followed is that of the Census Catalogue of British Mosses (1907). A short hour or so spent in Ling Gill gives ample evidence of the possibilities of the place for mosses, and one sees the more familiar forms as *Thuidium tamariscinum* B. & S., *Hylocomium triquetrum* B. & S., *H. loreum* B. & S., *H. squarrosum* B. & S., *Hypnum commutatum* Hedw., but how different with their wavy fronds six to nine inches in length. Then in dark crevices, *Porotrichum alopecurum* Mitt., *Mnium undulatum* L., *M. rostratum* Schrad., *M. punctatum* L. occur, of a size and growth that is scarcely associated with mosses. Some leaves of *M. punctatum* L. were over quarter of an inch in diameter. The striking features were *Trichostomum mutabile* Bruch. in all the crevices with swelling patches of *Bartramia Œderi* Sw., and in shady ledges *Orthothecium intricatum* B. & S., these three forming quite a feature of all the damp perpendicular faces of the limestone.

On Pennyghent this richness of growth was out of the question. The difference of the vegetation on the limestone scars, and the gritstone scars above them, was striking; and was even more apparent in the flowering plants; the wealth of *Saxifraga oppositifolia*, *Sedum roseum*, etc., is all gone when the grits are reached, but on these grits we get *Andreœa petrophila* Ehrh., and *A. Rothii* Web. & Mohr burnt up, dead looking patches which will open out, however, on the first touch of moisture, though now they crumble to dust when gathered. The *Rhacomitria* prefer these grit rocks, and here we got *Rhacomitrium heterostichum* var. *gracilescens* B. & S. although *Rhacomitrium lanuginosum* Brid. seemed at home on the limestone below.

In Douk Gill on the way to Pennyghent, we got *Plagiobryum Zierii* Lindb. *Webera elongata* Schwœg., and on a mass of tufa in a waterfall, *Amblyodon dealbatus* P. Beauv. and *Weissia verticillata* Brid., both in fine fruit ; the *Weissia* is very uncommon in this condition.

The preceding notes were made on the excursion of the Yorkshire Naturalists' Union to Horton-in-Ribblesdale last autumn, on which occasion the mosses seen which do not appear to have been previously reported from this district were *Oligotrichum hercynicum* Lam., *Seligeria pusilla* B. & S., *Rhacomitrium heterostichum* var. *gracilescens* B. & S., *Barbula. spadicea* Mitt., *Weissia verticillata* Brid., *Amblyodon dealbatus* P.B., *Webera elongata* Schwœg., *Leucodon sciuroides* Schwaeg.

GEOLOGY.

Vertebrate remains from the Chalk of Lincolnshire—During a recent visit to the chalk quarry at Barton-on-Humber, Lincs., I secured some fossils, a few of which I sent to Dr. A. Smith Woodward. He kindly informed me that one was apparently the crown of a tooth belonging to a reptile, but he could not give the generic name with certainty. This being so, it is the first record of any reptilian remains from the Lincolnshire chalk. The specimen can be seen in the Geological Gallery at the Hull Museum. The other special fossil Dr. A. Smith Woodward named for me, which is a rarity in this locality, is a fine tooth of *Scaphanorhynchus raphiodon* Ag., from the yellow marl of the *B. plena* zone. Besides these I obtained three teeth of *Oxyrhina mantelli*, and one tooth of *Ptychodus* sp ?—H. C. Drake, Hull.

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DIPTERA.

The Holly Leaf Burrowing Fly.—The Holly is rare at Cadney, being only a planted alien. Its leaf burrower, *Phytomyza aquifolii* Gaureau, is very common on the few bushes we have. I have to thank Dr. W. G. Smith for Messrs. Miall and Taylor's full account of this fly.—(' Transactions Ent. Society,' London, September 26th, 1907).—E. Adrian Woodruffe-Peacock, Cadney, Brigg.

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BIRDS.

Bittern and Rough-Legged Buzzard at Spurn,—Robinson, the Y.N.U. Watcher over Spurn, in his weekly report to me, mentions that he saw both a Rough-legged Buzzard and a Bittern on the warren on May 6th. Also several uncommon small birds, which he could not identify.—R. Fortune, Harrogate.

PLANT GEOGRAPHY AND ECOLOGY IN SWITZERLAND.

T. W. WOODHEAD, Ph.D., F.L.S.

(*Continued from page 174*).

Of works dealing with special branches, mention may be made of the paper by Vogler.* This contains a detailed account of the morphology and biology of the seeds of ten orders of Alpine plants, the adaptations for dispersal of the seeds of the plants of the whole Swiss flora, and a detailed comparison between plants of the plains and Alpine plants as to their means of dispersion. Oettli,† studied the southern rocky calcareous slopes of the Churfirsten and the Säntis, and deals in an exhaustive manner with the habitats and adaptations of rock plants.

Schellenberg has done much work on the importance of hemi-cellulose as a food reserve in the leaves, etc. of Alpine and other plants, while Keller (1887, F. H., 192) Briquet, (1896, F. H., 192), Fisch (1899, F. N., 192), and Günthart,‡ publish many observations they have made on the biology of the flowers of Alpine plants.

Forests and Forestry Studies.—Forestry occupies an important position in the economy of Switzerland. The literature is very extensive, most of the works mentioned in this paper contain chapters on the forests of the regions dealt with. Of recent papers, special reference may be made to the following :—E. Geiger's, § 'Das Bergell' and Bettelini's, || 'La flora legnosa del Sottoceneri,' deal in an excellent manner with the distribution of trees and shrubs of the districts concerned, and Dr. Brunies ¶ has recently completed a study of the flora of the 'Ofengebietes,' which besides chapters on geology, climatology, formations and flora contains an elaborate study

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* P. Vogler, 'Uber die verbreitungsmittel der schweizerischen Alpenpflanzen.' Flora Bd. 89. 1901.

† Max Oettli, 'Beiträge zur Ökologie der Felsflora. Jahrb. d. St-Gallischen Naturwiss. Ges. 1903.

‡ A. Günthart, 'Beiträge zur Blüthenbiologie der Cruciferen, Crassulaceen, und der Gattung Saxifraga.' Bibliotheca Botanica, Heft 58. Stuttgart, 1902.

§ E. Geiger, 'Das Bergell ; eine forstbotanische Monographie.' Jahresbericht d. Naturf. Ges. Graubündens. Chur., 1901.

|| A. Bettelini, 'La flora legnosa del Sottoceneri.' Zürich, 1905.

¶ S. E. Brunies, 'Die Flora des Ofengebietes.' Jahresbericht d. naturf. Ges. Graubündens.

of *Pinus montana* and *P. sylvestris* and their hybrids, also of *P. engadinensis*. It is accompanied by an excellent map shewing the distribution of trees in the district.

In 1902, the Forestry department of Switzerland initiated an elaborate study of all the woodland plants and forests of the country, the work being directed by Dr. J. Coaz, chief inspector of forests, and Prof. C. Schröter. In connection with this a small booklet was prepared giving suggestions as to the observations to be made, and the nature of the information required, such as habitats, frequency, limits, exposure, and the like, and some hundreds of these were distributed to the foresters throughout Switzerland. All the Swiss forests are under Government control, and an official notice was sent out requiring all foresters to make the required observations and fill up the schedules. The Kanton of Geneva appointed a botanist especially to superintend this work in their area, and the results obtained, together with the special investigations of the authors are now printed. This part * being the first of twenty or more, each illustrated with photographs, coloured maps, etc., the whole forming when complete, a very elaborate work. The cost of preparation and publication is defrayed by the Government.

MOORLANDS.—Considerable progress has been made in Switzerland in the study of moorland vegetation and the composition of peat. The most important contribution to this subject is the large volume 'Die Moore der Schweiz,' 1904, by Früh and Schröter. This splendid volume is the outcome of a Commission appointed and subsidised by the 'Schweizerische naturforschende Gesellschaft.' It is probably the most complete account of the moors of a country that has ever been published. It contains over 700 pages, has an excellent map, and many illustrations of the microscopical structure of peat, etc. This work not only summarises the results of previous observers as Lesquereux, Früh, Hebler, Neuweiler, Schröter, Düggeli and others, but gives the results of special and prolonged observations of the authors. Düggeli's paper,† is of special interest in that he has made a detailed study of an area in the Sihltal, near Einsiedeln, which, in the near future, will be submerged by the projected ‘Sihlsee.’ Here, in addition to a study of the general phyto-geographical features, he made a special study of the microscopical structures of the peat, and gives the results of an examination of 23 sections to a depth of five feet. The mycology of the peat was also studied, as well as the plankton of the Sihl, the latter with a view to comparing it eventually with the plankton of the artificial lake.

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* J. Coaz and C. Schröter, 'Erhebungen über die Verbreitung der wildwachsenden Holzarten in der Schweiz.' Lieferung I. Gebiet des Kantons Genf. 1906 (by Dr. Lendner).

† Max Düggeli, 'Pflanzengeographische und Wirtschaftliche Monographie des Sihltales bei Einsiedeln.' Vierteljahrschrift d. naturf. Ges. Zürich, 1903.

PASTURES AND MEADOWS.—Under the title ‘Beiträge zur Kentniss der Matten und Weiden der Schweiz,’ Profs. Stebler and Schröter in 1887 commenced the publication of an extremely detailed study they had made on the plant formations composing the pastures and meadows of Switzerland. This study, aided by an annual grant from the Government, has been continued to the present time, the tenth contribution (1892, F. H., 77), consisting of a summary of previous papers. As part of this work, Stebler (1897, F. H., 79), has published the result of his studies of the ‘Streueweisen’ of Switzerland. This paper gives a very detailed account of the different types of rough, wet meadows. The amount of straw produced in Switzerland is very limited, consequently the coarse grasses, sedges, etc. of these ‘wastes’ are cut for bedding for cattle, and are thus of considerable economic importance, such meadows, being unsuitable for grazing, are reserved especially for this purpose.

Further observations on the study of meadows have been published by Stebler and Volkart *, dealing with the effect of light and shade on the composition of those meadows over which a considerable number of fruit and other trees are distributed. (‘Baumgärten’ or ‘Waldweide.’)

These studies on meadow vegetation have been highly appreciated by agriculturists, and the publications of the Swiss Agricultural Department (Landwirtschaftliches Jahrbuch der Schweiz), are sold at a nominal price by virtue of a Government grant, *e.g.*, an annual volume published at 5 to 6 francs is sold to students of agriculture, forestry, etc. for 1 franc 20 cents.

In addition to, and as an outcome of these studies, a series of volumes has been issued dealing with such subjects as the best fodder plants of the plains, the best fodder plants of the Alps, the best bedding plants, etc., (1884, F. H., 77). Each volume contains 15 or more life-size coloured illustrations of the more important species, in addition to many other figures, along with the more important botanical and economic details of the species. These are sold to the argiculturalists at 1 fr. 30 cts. Large numbers are sold every year, and are apparently much appreciated.

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* G. Stebler and P. Volkart, ‘Der Einfluss der Beschattung auf den Rasen.’ Landw. Jahrb. d. Schweiz., XV., 1904.

Jaccard, (1896-1900, F. H., 19, 20, 88, 193), has made many detailed observations on the flora of Alpine meadows, and endeavoured, by statistical methods,* to bring into something like order the peculiarities of their composition.

PLANT-GEOGRAPHY MONOGRAPHS, AND STUDIES OF SPECIAL FORMATIONS.—No systematic attempt has been made in Switzerland to treat uniformly the plant-geography of the country, though many selected areas have been studied in very great detail. As already mentioned, Heer's work on a part of Kanton Glarus set the fashion in this kind of study. The chief works in this direction, to mention only a few are those of Briquet (1891-6, F. H., 65, 144, 145), one by Schröter on 'St. Antonierthal im Prattigau' (1895, F. H., 135), is an exceedingly interesting study of a small district, and deals not only with geographical and geological features, plant formations and limits, but also many details concerning local agriculture. The coloured map accompanying the paper not only indicates the distribution of the dominant trees, rhododendron, *Alnus viridis*, etc., but gives 32 types of meadow vegetation, the latter sometimes regarded as an illustration of 'hair-splitting' in plant-geography.

Chodat,* deals with the sand dunes near Lake Geneva, and compares the flora with that of dry, sunny, rocky slopes (Felsenheide). It is in this paper that he introduces the term 'Garide,' a word compounded of Garigue and Arid.

Aubert (1900, F. H., 111), discusses at great length the immigration of the flora, in addition to descriptions of formations, limits, edaphic conditions, and the like of the Vallée de Joux.

Hegi,† discusses the question of glacial relics, concluding that these species are confined to localities which were free from ice during the last glacial period. He is supported in this by Schmidt in his studies in Appenzell,* but this conclusion is disputed by Schröter, and also by Nägeli, who point out that some areas previously covered by ice have later become occupied by these plants as a result of normal modes of plant dispersal.

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* P. Jaccard, 'Gesetze der Pflanzenverteilung in der alpinen Region.' Flora Bd., 90. 1902.

* R. Chodat, 'Les dunes lacustres de Sciez et les Garides.' Ber. d. Schweiz. bot. Ges. XII., 1902.

† G. Hegi, 'Das obere Tössthal und die angrenzenden Gebiete.' Mitteil. aus dem bot. Mus. d. Universität Zürich XVI., 1902.

The most recent, and in many respects the best and most elaborate of these monographs, is that by Dr. Brockmann-Jerosch,* In this work, extending over 400 pages, we get probably the most complete analysis of the plant associations of a small area that has ever been attempted. Prof. Schröter's work has been criticised for the great sub-division of types of meadow vegetation, but Brockmann's researches in the Puschlav tend to strengthen his position, and to shew in a striking manner the ecological significance of these associations. It is the most characteristic piece of work of the Schröter School.

Rikli † gives a very complete summary of the plant associations, regions, and phytogeographical elements of the Kanton Tessin, as well as of the Lägern, at the end of the Jurassic chain in Kanton, Zürich, and he has also prepared a very thorough monograph on the distribution of *Pinus cembra* in Switzerland, which will be issued during the present year.

Chenevard (Geneva) has published many papers on his investigations of the Flora of Tessin, and Baer, a pupil of Schinz, has contributed much to the knowledge of the Kanton.

R. Keller has written a detailed account of the Corylus association at Val Blenio. ‡

On the floristic side, and the work of greatest use to those preparing these Swiss monographs, is the excellent 'Flora der Schweiz,' by Schinz and Keller (2nd Ed., 1905). Advances made in the knowledge of the Swiss flora are contributed to the 'Beiträge zur Flora der Schweiz,' by Schinz and his pupils, and in 'Fortschritte d. Schweizerischen Floristik,' in the bulletins of the Swiss Botanical Society, formerly by Schröter, now by Rikli. The near future will see the publication of further monographs on similar lines by students of Profs. Schröter and Schinz, *e.g.*, Dr. Grisch on the flora of the Bergünerstöcke,§ A. Geilinger on the Grigna, and F. Jäggli on the Camoghé gruppe. These phyto-geographical and ecological studies are fostered by, and largely the outcome of the National Agricultural School, and they never lose sight of the fact that the problems involved are really agricultural and forestry problems.

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* H. Brockmann-Jerosch, 'Die Flora des Puschlav und ihre Pflanzengesellschaften.' Leipzig, 1907.

† M. Rikli, 'Zur Kenntniss der Pflanzenwelt des Kantons Tessin.' Berichte d. schweiz. bot. Ges,, Heft XVI., Bern 1907. 'Das Lägerngebiet,' phytogeogr. Studie XVII., 1908.

‡ R. Keller, 'Vegetationsbilder aus dem Val Blenio. Mitt. naturw. ges. Winterthur, 1903-4.

§ Grisch, 'Beiträge zur Kentniss der Pflanzengeographischen Verhältnisse der Bergünerstöcke.' Beihefte d. bot. Centralblatt, 1907.

ALIENS have always been an unsatisfactory element to deal with, but Rikli and Nägeli and Thellung have made a fairly satisfactory attempt to deal with them according to their modes of origin.* The names suggested for the groups, however, are too unwieldy ever to come into general use.

SWISS SURVEY MAPS are published in two scales :—(*a*) for the plains, 1 : 25,000, (*b*), for the Alps, 1 : 50,000. They shew clearly and exactly the following features as regards vegetation : (1) Region of vine cultivation ; (2) Pastures and meadows, (3) Moors ; (4) Moors cut for peat ; (5) Forests ; (6) Rocky slopes (Felsenheide) ; (7) Alpine region ; (8) Snow and Ice. These maps are perhaps the most beautiful in existence, and we must admit, that from a vegetation point of view, they are a great advance on our own, and the details we are shewing on our vegetation maps are already published to a considerable extent by the Swiss survey. It is very important to keep this fact in mind when considering their plant-geography papers. No distinction, however, is drawn between coniferous and deciduous forests, while *Pinus montana*, usually regarded as a shrub in plant-geography maps, is here included in the forest region, a detail doubtless influenced by military considerations. It has been the object of some of the works referred to (*e.g.* Geiger, Bettelini, Brunies, etc.) to study in detail the distribution of the several species of trees, and bring out the main factors affecting their distribution. Imhof,† a pupil of Brückner, has published an excellent study on the limits of forest in Switzerland, based upon the survey maps.

ECOLOGICAL STUDIES OF THE CRYPTOGAMIC FLORA.—Cryptogamic Ecology (apart from plankton), has received considerable attention. So early as 1871 (F. H., 64), Pfeffer published especially interesting observations on the Bryogeography of the Rhœtic Alps, noting the effects of altitude, subsoil, and the like on the distribution of the several species.

Amann (1894, F. H., 59), studied the moss flora of the erratic blocks of the Swiss 'Hochebene' and the Jura, and shews that the mosses growing on these blocks have not been brought with them from the Alps.

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* See 'Naturalist,' 1906, p. 124.

† E. Imhof, 'Die Waldgrenze in der Schweiz. Leipzig,' 1901.

Meylan (1898-1900, F. H., 60, 210), has written much on the geographical distribution of mosses in the Jura. Amann has ready for publication an elaborate work on the moss flora of Switzerland, the introductory chapters of which will deal with the geographical distribution of mosses on essentially the same lines as adopted by Christ for flowering plants.

Von Tavel, (1893, F. H., 35) worked out in a particularly interesting manner the connection between heteræcious Uredineæ and plant associations, shewing that the two hosts are usually constituents of the same plant association. These relations are worked out with still greater thoroughness by Fischer in his Uredineæ of Switzerland. This we may regard as leading the way for much interesting work on the ecology of fungi.

LAKES AND THE STUDY OF AQUATIC VEGETATION.—Much time has been spent on the investigations of Swiss lakes, and numerous monographs, often of considerable extent have been published. Complete monographs have already appeared for the lakes of Geneva, Constance, Katsensee, Lac de Brett, Lützelsee, and the lakes of the whole Jura. All the large lakes and many of the smaller ones have been studied to a greater or less extent. Monographs on the Lake of Lucerne are now being published, those dealing with the physical properties of the lake, and the Fauna are completed and also a portion of the Flora. The more important works in this direction are by Forel (1874—, F. H., 16, 49, 53), Magnin (1892-4, F. H., 16), Schnetzler (1885—, F. H., 60), Chodat (1895—, F. H., 48, 49, 50, 53, 54), Pavesi (1889, F. H., 52), Overton (1887-9, F. H., 51), Hochreutiner (1896-7, F. H., 92), Pitard (1896-7, F. H., 47, 48, 49, 51), Brun (1881-4, F. H., 16, 49), Heuscher (1891, 5, F. H., 16 and 17), Fuhrmann (1899, 1900, F. H., 17, 50), Kirchner (1896-9, F. H., 17), Schröter [*] (1895-7, F. H., 17, 45, 192), Zschokke,[†] also several papers by Schröter's pupils, *e.g.*, Amberg (1899-1900, F. H., 51), Waldvogel (1900, F. H., 17), Lozeron,[‡] and Bally,[§] the four latter workers, as well as

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[*] C. Schröter and Vogler, 'Variationsstatistische Unters. über *Fragilaria crotonensis,etc.*' Vierteljahrschrift d. naturf. Ges. Zürich, 1901.

[†] F. Zschokke, 'Die Tierwelt der Hochgebirgseen.' Basel, 1900.

[‡] H. Lozeron, 'La répartition verticale du Plancton dans le lac de Zürich.' Vierteljahrschrift d. naturf. Ges. Zürich, 1902.

[§] W. Bally, 'Der obere Zürichsee.' Archiv. f. Hydrobiologie III. Stuttgart, 1907.

Backmann, Chodat and Forel have given much attention to the phenemona of periodicity.

The most elaborate and complete monograph is that of Lake Constance.* This extensive series of monographs has been published by a Limnological Commission appointed and financed by the Governments of Switzerland, Austria, Baden, Byern, and Würtemburg, each of the five States sending a delegate to the Commission. This work furnishes an excellent illustration of the value of co-operation in science in a common research.

PHÆNOLOGY.—Phænological observations were practically inaugurated by Heer, who in 1844, (F. H., 194) published the results of his investigations on the periodical appearance of plants and animals. Schwendener, who was a student under Heer, continued the work, and the results, which were published in 1856 (F. H., 194), formed the subject of his inaugural dissertation. Since then, over a hundred papers on this subject have appeared (see F. H., 193 to 201), the most systematic work emanating from the Forestry Department of Kanton Bern, which, for nearly forty years, has made a detailed study of these phenomena.

STUDIES ON SOILS. Respecting the influence of soils on the distribution of plants, in addition to the works already mentioned, several papers have recently appeared. Vögler † has studied the problem of physical or chemical influences on the distrbution of Alpine plants in the Albula pass (2,300 metres), and concludes that the chemical influence dominates. Liechti and Mooser,‡ have made many interesting experiments on the indirect effect of $CaCO_3$ in favouring nitrification in the soil. They shew that in many soils the other forms of calcium salts are in greater quantities than $CaCO_3$.

Stebler,§ has shewn that if pieces of chalk are present, but the finely divided soil contains no chalk, such a soil can support a chalk flora. In connection with these investigations on the effect of lime on plants, the Swiss Agricultural Stations make gratis, for each farmer, an analysis of his soils respecting lime contents.

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* C. Schröter and O. Kirchner, 'Die Vegetation des Bodensees.' Lindau, 1896 and 1902.

† P. Vogler, 'Beobactungen über die Bodenstetigkeit der Arten im Gebiete des Albulapasses.' Berichte d. schweiz. bot. Ges. Bern, 1901.

‡ Liechti and Mooser, 'Untersuchungen über das Kalkbedürfniss schweizerischer Kulturböden.' Landw. Jahrb. der Schweiz., pp. 141-175, 1904.

§ F. G. Stebler, 'Der Kalkgehalt einger Esparsetteböden.' Landw. Jahrb. der Schweiz, 1906.

COMMISSIONS.—Reference has been made above several times to Commissions. These are appointed and controlled entirely by the Schweizerische naturforschenden Gesellschaft. This Society receives every year a grant of about 60,000 francs (£2,400), from the Government, for conducting scientific investigations, and they cover a wide field. Many of the excellent works referred to above are the outcome of a co-operation of the several branches concerned, botany, zoology, geology, physics, chemistry, etc.

In addition to the publications already mentioned as issued by these Commissions, reference should be made to the 'Kryptogamic Flora Commission,' which issues every year a monograph on some part of the cryptogamic flora of Switzerland. The last issued is a large volume of 591 pages and 343 figures, on the Uredineæ of Switzerland, giving the results of twenty years' observations on the group by E. Fischer. This work cost over 5,000 francs, defrayed partly by the Government, partly by the Naturforschenden Gesellschaft.

THE BERNINA BIOLOGICAL OBSERVATIONS.—In May, 1905. Dr. Ed. Rübel, acting on the suggestion of Prof. Schröter, established for one year a biological station at Berninahospiz. The object was to make a more detailed study than has hitherto been attempted, of the conditions of plant life in the Alps. The Hospiz is 2,309 metres above sea level, and a good centre for the surrounding peaks of the Bernina group, some of these, *e.g.*, Piz Bernina, rising to 4,052 metres (13,170 feet). The station was equipped with all the necessary meteorological instruments, and records were regularly taken three times daily at 7 a.m., 1 p.m., and 9 p.m. I had the privilege of spending a month here in July and August 1905, making frequent excursions to the surrounding peaks, and did space permit, I could say much about the interesting work that is going on, but it must suffice to say that the work in progress covers almost every branch of ecological research, and a number of interesting observations have been made, though as yet, only preliminary results have been published. Considerable interest was taken in the station, and it has been visited by many botanists of note.

EXCURSIONS.—Studies in plant-geography and ecology are fostered in Switzerland by the excellent series of excursions.

which are a characteristic feature of the Swiss botany schools, especially those of Zürich and Geneva.

Prof. Chodat of Geneva was the first to organise big excursions, *e.g.*, in 1899 he accompanied his students to Mallorca, where three weeks were spent in studying the flora of this interesting island in the Mediterranean. He had previously made excursions to the south of France, Corsica, Italy, and the south of Spain.

In the botany school of the Polytechnicum of Zürich, under Prof. Schröter, some twenty days are devoted to excursions during the summer semester, several taking place at weekends. Two are for longer periods, viz. : four days at Whitsuntide, and another lasting seven to eight days at the end of the semester. This longer or 'Schluss-excursion' is usually in the Alps. They are remarkably well-organised, and excellently adapted to give students an insight into the various plant associations, to encourage careful observation in, and stimulate an interest for work in the field. They are relatively inexpensive, but to meet the needs of students who have not the means, a fund exists of 30,000 francs (£1,200), the interest of which is distributed as thought desirable. Thus many students are able to profit by them, who would otherwise be debarred.

A visit to the Alps, in company with Prof. Schröter, is indeed the happiest of experiences, his extensive knowledge of the Alpine flora, in all its varied branches, his untiring energy and interest in his students, is equalled only by his geniality and genuine comradeship.

My visit to Switzerland happened to fall at a most favourable period, a year of big excursions, for, in addition to many excursions in the Swiss Alps, Prof. Schröter invited me to accompany him to the Southern Carpathians, through the plains of Hungary to the remarkable 'pusta' of Hortobagy, then through the Stiermark Alps and the Tyrol to the Alps of Northern Italy.

In March, 1906, his colleague Dr. Rikli, following the example set by Prof. Chodat, organised a month's excursion to the Mediterranean,*, when 25 of us, professors and students, had the opportunity of studying the flora of Mallorca, and in Spain, from Alicante through the south of the Peninsula, over the Sierra Nevada to Granada, then to Madrid, and Barcelona, ending a most interesting tour by a visit to Montserrat. Dr. Rikli has this year organised a still greater excursion, extending over six weeks, to Spain and the Canary Islands, with a party of 35. The Swiss have great faith in the educational value of excursions, and to me they were certainly of the greatest interest.

LIST OF PORTRAITS.

Dr. John Briquet, Director of the Botanical Gardens, Geneva; Dr. Robert Chodat, Professor of Botany in the University of Geneva; Dr. Paul Jaccard, Professor of Plant-physiology in the Federal Polytechnic, Zürich; Dr. Hermann Christ, Director of the International Academy of Botanical Geography for 1907; Dr. Joh. Coaz, Chief Inspector of Forestry in Switzerland; Dr. Hans. Schinz, Director of the Botanical Gardens, and Professor of Botany in the University of Zürich; Dr. Robert Keller, Rector of the Gymnasium and Technical School in Winterthur; Dr. Martin Rikli, Curator of the Botanical Museums in the Federal Polytechnic, Zürich; Dr. Carl Schröter, Professor of Botany in the Federal Polytechnic, Zürich.

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Plant Anatomy, by **Wm. Chase Stevens.** London: Churchill, pp. vii-349, with 136 illustrations. 10/6.

The fuller title of this book 'Plant Anatomy from the standpont of the development and functions of the tissues and handbook of micro-technic,' indicates pretty well its nature and scope. The clear type, and numerous excellent figures in this book produce a good impression, at first glance, and a close examination serves to strengthen rather than diminish it. The cell and differentiation of the tissues are first dealt with, then follow chapters on absorption, circulation, food, storage, secretion and excretion; four chapters are devoted to micro technique of which the author is no mean authority, and the last one deals with the detection of adulterations in foods and drugs. As the functions of the tissues are always kept well to the front, the reader is never bewildered by mere anatomical details. Misprints are few, and though some details need bringing up to date, and others would be improved by a little more elaboration, it is one of the best elementary treatises we have seen for a long time, and both teacher and student will find it a useful book.

The **'Guides'** now being issued by the Natural History Dept. of the British Museum are a great improvement upon the old style of publications issued from our national institution. They are surely now as near 'perfect' as possible—each being not only a guide to the particular specimens referred to, but practically an introductory handbook to the subject. We have recently had sent to us the 'Guide to the Gallery of Fishes' (1/-), and a 'Guide to the Elephants, Recent and Fossil' (6d.). The former is by Dr. Ridewood, is well illustrated, and has no fewer than 209 pages. In Sir E. Ray Lankester's Preface it seems odd to read 'Every specimen in the gallery is provided with a number, and is referred to in this guide by that number *printed in thick, large type*,' and then, as a post-script, a few lines further on, to find 'Since the above preface was written, it has been thought desirable *not to use the thick, large type*.' Dr. C. W. Andrews has prepared the 'Elephant' guide, and, as such a subject as is dealt with, lends itself so well to an introduction to the study of teeth, advantage has naturally been taken of this by Dr. Andrews. These various guides issued by the South Kensington authorities, are admirable volumes for the use of the naturalist, and are so worded as to be understood by young people.

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* M. Rikli, 'Botanische Reisestudien von der spanischen Mittelmeerküste.' Vierteljahrs. d. naturforsch. Ges. Zürich, 1907.

RECENTLY DISCOVERED FUNGI IN YORKSHIRE.

C. CROSSLAND, F.L.S.
Halifax.

The following is the second summary of newly discovered Yorkshire species since the issue of the 'Yorkshire Fungus Flora' in 1905. It includes one species new to science, and twenty-four new to Yorkshire. These bring the total of known Yorkshire species to 2706. The numbers given under each, to precede or follow, are those of the species in the Flora.

NEW SPECIES.

HUMARIA GLOBOSO-PULVINATA n. sp.

Ascophores gregarius or scattered, reddish flesh colour, at first globose, then globose-pulvinate, attached by a central point, disc convex, fleshy, 1–1¼ mm. across, ½ – ¾ mm. thick flesh soft, exterior glabrous; excipulum of interwoven, branched, septate hyphæ of irregular diameter, 3–5μ, cortical cells subglobose, 7–8 μ diam.; asci broadly cylindric-clavate, rapidly narrowing near the foot, often curved, 140–150 × 16–18 μ, apex truncato-rounded; spores 8, obliquely one or irregularly two seriate, hyaline, oblong-elliptical, eguttulate, continuous, smooth 12 × 8 μ; paraphyses profuse, filiform, occasionally branched, 3 μ diam. contents granular, reddish.

On sediment, among *Bryum argenteum*, in disused dye tank, near Hebden Bridge, October 27th, 1907.—Coll. J. Needham.

The ascophores occasionally grow in little heaps or clusters of 4–8 individuals. Has the general appearance of an *Ascophanus*, but the tips of the asci do not make the surface of the disc uneven, nor do the asci dehisc by an operculum, as in the that group, but by a slit across the apex. The spores on reaching maturity occupy the upper half of the ascus, later they become sub-biseriate in the upper two-fifths.

The apices of the asci do not stain blue with iodine.

Under the present arrangement of the British Discomycetes, I have thought it best to include this species in the genus *Humaria*, although M. Boudier, to whom specimens have been submitted, does not consider it to be a *Humaria* as at present understood, and further remarks :—' It is intermediate between *Pulvinula* and *Pyronema*, and might form a group with *Ascophanus aurora* (Cronan) which I have included with *Ascophanus*, but which is abnormal there, and which should certainly be separated therefrom. Your species comes to give a new weight to this opinion.'

Humaria globoso-pulvinata sp. nov.

Ascophoris gregariis vel sparsis, subrubro-carneis, parumper solidis et globosis, tum globoso-pulvinate, parte centrali affixis, carnesis, 1–1.25 mm. latitudina, 0.5–0.75 mm. crassitudine, externe glabris, carne molli, hyphis excipuli intertextis, ramosis, septatis, diametro irregulare, 3–5 μ, cellulis corticalibus subglobosis, 7–8 μ diam.; ascis late cylindrico-clavatis, sæpe curvatis 140–150 × 16–18 μ apice truncato-rotundato, angustioribus subtio ad pedum versus; sporis 8, hyalinis, oblongo-ellipticis, eguttulatis, continuis, levis, 12 × 8 μ, paraphysibus profusis, filiformis, interdum ramosis, 3 μ crassitudine, plasmate granulare, subrubre.

NEW TO YORKSHIRE.

Mycena excisa Lasch (non Berk.).

Mid. W.—Buckden, on pine log, (Fungus Foray, '07, 'Nat.', Nov. '07, p. 398). Differs from *M. Berkeleyi* in the gills being less broadly sinuate behind, in not having a purple or flesh coloured tinge, and in the smooth stem. [To precede No. 223].

Mycena pterigena Fr.

Mid. W.—Grass Woods on decaying fern rachis. [To follow No. 264].

Clitocybe catina Fr.

N.E.—Helmsley, among leaves, Nov. '06. H. Slater. [To precede No. 162].

Omphalia demissa Fr.

S.W.—Higher Greenwood, near Hebden Bridge, on moss, May 1893. Accidentally omitted from the 'Yorkshire Fungus Flora.' [To follow No. 279].

Omphalia camptophylla Berk.

Mid. W.—Buckden Wood, on rotting twigs. (F.F., '07, 'Nat.', Nov. '07, p. 398). [To follow No. 285].

Entoloma bulbigenum B. and Br.

Mid. W.—Buckden, on the ground. (F.F., '07, 'Nat.', Nov. '07, p. 398). [To follow No, 339].

Clitopilus popinalis Fr.

S.W.—Thorne Waste, among grass on the margin of a wood. Y.N.U. Excursion, July '07. ('Nat.', Sep. '07, p. 323). [To follow No. 361[.

INOCYBE SCABELLA Fr.

S.W.—Thorne Waste, among grass in the wood. Y.N.U. Excursion, July '07. ('Nat.', Sep. '07, p. 323). [To precede No. 449].

HEBELOMA MAGNIMAMMA Fr.

Mid. W.—Grass Woods, on the ground among decaying twigs, herbaceous stems, etc. [To precede No. 466].

FLAMMULA GYMNOPODIA Bull.

S.W.—Healey House Wood, near Huddersfield, Nov. '07 — A. Clarke. [To be placed first in the British species of this genus].

FLAMMULA CONNISANS Fr.

S.W.—Slaithwaite, on a willow log, Nov. '07.—E. J. Walker, *Certe.* A. Clarke. [To precede No. 475].

GALERA TENERA var. PILOSELLA Pers.

S.W.—Farnley Tyas, among grass in pasture. (F.F., '06, 'Nat.', Feb. '07, p. 55).

LACTARIUS UMBRINUS Pers.

S.W.—Luddenden Dean, near Halifax, on the ground in a mixed wood, Sep. '07. [To precede No. 823].

RUSSULA VITELLINA Fr. var. MAJOR Cke.

S.W.—Callis Wood, near Hebden Bridge, [No. 903].

LENTINUS LEONTOPODIUS Schulz.

S.W.—Near Huddersfield, on old timber, July '07.—B. Goldthorpe. *Certe.* A. Clarke. [To follow No. 946].

UREDO MULLERI Schrot.

N.W.—Masham, on Rubus sp., Sep. 1901. —W. A. Thwaites. Was accidentally omitted when the 'Y. F. Flo.' was compiled. [To follow No. 1395].

LACHNEA HIRTO-COCCINIA Phil. and Plow.

N.E.—Strensall Common, on wet sand among moss near a water-splash, July 1907. — W. Ingham ('Nat.', Nov. '07, p. 404). [To precede No. 1825].

LACHNEA RUBRA (Cooke) Phil. Brit. Disc. p. 225.

S.W.—Luddenden Dean, near Halifax, on a mixed heap of muddy refuse from paper mill, night soil, fine ashes, etc., August 1907.

Mons. Boudier, to whom I have submitted specimens, considers this to be closely related to *L. rubra*, but smaller in size ; it appears to me to fit this one best with this exception coupled with the rather smaller spores. The smaller size of the ascophore, compared with Cooke's specimens found on spent hops, may, to some extent, be accounted for by the habitat. It is much safer to place it under *L. rubra* than to describe it as a new species. [To precede No. 1832].

Ascophanus cinereus (Crouan) Boudier.

Mid. W.—Arncliffe, on rabbit dung. Y.N.U. Excursion, August '07, (' Nat.', Oct. '07, p. 353). [To follow No. 2049].

Glœosporium ribis Mont. and Desm.

S.E.—Brough, on leaves of red currant, Sep. '05.— A. R. Warnes. [To follow No. 2280].

Triposporium elegans Corda.

N.E.—Robin Hood Bay, on rotten wood. Y.N.U. Excursion, May '07. (' Nat.', 1907, pp. 253 and 285). [To precede No. 2428].

Fusarium diffusum Carm.

S.W.—Crow Wood, Sowerby Bridge, on dead cabbage stalks on refuse heap, June 1907. [To precede No. 2470].

Differs from *F. brassicæ* in colour, and from *F. cordæ* in the longer conidia.

Cribraria rufa (Roth.) Rost. (*C. rufescens* Pers.).

Mid. W.—Grass Woods, on rotten wood, (F.F., '07, ' Nat.', Nov. '07, p. 339). [To follow No. 2495].

Arcyria Karstenii (Rost.) Mass. (*Hemitriehia Karstenii* List. ' Mon. Myc.', pp. 178–9).

Mid. W.—Arncliffe, on dry cow dung near farm buildings, Y.N.U. Excursion, August '07. (' Nat.', Oct. '07, p. 351). [To follow No. 2520].

Didymium sinapium Cke. (*Physarum virescens* Ditm. List. ' Mon. Myc.', pp. 69 and 104).

S.W.—Northdean Wood, near Halifax, on dead leaves. Accidentally omitted when the ' Y. F. Flo.' was compiled. [To follow No. 2550].

The coral-pink Peziza found on the railway side near Medge Hall Station during the excursion to Thorne Waste last year (see ' Naturalist,' September '07, p. 322) proves, after all, to be a form of *Peziza Adæ.* We doubted its being that species at the time, and considering it new, drew up a full description direct from the fresh material, and found it a very suitable name—*roseo-corallina.* The description was even put in type, but withdrawn at the last moment. It is so near to *P. Adæ* that we did not feel absolutely safe in publishing it as a new discovery. The principal differences in the published descriptions of *P. Adæ,* and the Thorne Waste plant lie in the ascophore of the latter being smaller, and its spores larger ; neither do the colours of the disc quite agree. In *Adæ* they are said to be 'white, rosy-white, violaceous, or ochraceous.' The Thorne Waste specimens were not so variable, being mostly pinky-coral with, in some cases, a very faint tinge of violet ; in old specimens, beginning to decompose, a trace of ochre made its appearance. The spores measure 15–17 × 8 μ. Those of *Adæ* are given in Cooke's 'Mycoyr' as 12·5 × 7 μ, in Phillip's 'Brit. Discomycetes' 13 × 7 μ, in Massee's 'British Fung. Flor.' 11–12 × 7 μ. If we consider previous examiners to have been slightly under the mark, and ours slightly over, the mean between Phillip's and our own measurements brings them pretty well into line. No published characters include the size of the asci so that no comparison can be made on that point. (These are 270–290 × 11–12 μ, which certainly fits Massee's statement in 'British Fungus Flora'—*asci narrowly cylindrical.*'). Nor are the hyphæ composing the excipulum fully and definitely described. All points considered, and allowing for variability, many fungi are subject to, both in size and colour, it is much safer to record the Thorne Waste gathering as *P. Adæ* than to make a new species of it, which may only lead to future confusion. It has three previous records for the county, but we do not remember having seen it before.

CORRECTIONS.—The *Omphalia bullata* recorded for Bolton Wood, 'Nat.', Nov. '07, p. 398 is a misprint. It should read—*O. bullula*

Under *Lachnea cinnabarina,* 'Nat.,' Jan., 1906, p 82, for spores 15-18 × 18 μ, read 15-18 × 8 μ.

ADDENDA.

COLLYBIA COLLINA (Scop.).

S.E.—Bainton, in decaying stump. [To follow No. 188].

HYGROPHORUS LIMACINUS Fr.

S.E.—Bainton, among dead leaves in a wood. [To follow No. 771].

Both these were discovered by the Rev. F. H. Woods, Bainton, near Driffield, in October, 1906.

THE ICE-BORNE BOULDERS OF YORKSHIRE.

J. H. HOWARTH, J.P., F.G.S.

(Continued from page 180).

In the following lists the principal identifiable erratic rocks are selected, and the places where they have been found alphabetically arranged. The size is given of larger specimens, and recorders' names added (*in italics*) to indicate the authority.

ARMBOTH DYKE.

East Gawber Colliery, near Barnsley. In boulder clay, 6′ thick, 250 O.D. —*Hemingway.*

Hornsea. 4″ × 3″ × 3″—*Walton.*

Robin Hood's Bay.—*Sheppard & Muff.*

Tees Side. At North Ormesby and South Bank, in boring 30′ to 120′ deep.—*Tate.*

BORROWDALE ANDESITE, &c.

Alverley. 6″ × 4″ × 4″.—*Culpin & Grace.*

Balby, near Doncaster. Woods Sand Pit.—*Corbett & Kendall.*

Balby, near Doncaster. Pit belonging to Doncaster Brick Company, Andesitic breccia, Lake District.—*Corbett & Kendall.*

Balby, near Doncaster. Pit belonging to Mr. Gibson. 5 specimens.—*Corbett & Kendall.*

Battyeford.—*Carter.*

Brompton, near Northallerton.—*Hawkesworth.*

Coxwold. In a quarry beside Shandy Hall.—*Kendall.*

Elland.—*Spencer.*

Horbury.—*Burton.*

Kilburn.—*Kendall.*

Luddendenfoot, Calder Valley.—*Spencer.*

Millwood, Todmorden. In excavation for gasometer tank through glacial drift, 4″ × 3″ × 3″.—*Law.*

North Dean.—*Spencer.*

Sowerby, at Snape Farm, Steep Lane. 800 O.D. 3″ × 2″ × 2″.—*Saltonstall.*

Sowerby Bridge.—*Spencer.*

Staincross. Near Station; 300′ in boulder-clay, sands, and gravels, —*Hemingway.*

Swainby, Scarth Nick. 625 O.D.—*Kendall & Muff.*

Walsden Valley, Long Lee Quarry. 900 O.D. 24″ × 18″ × 14″.—*Law.*

BORROWDALE ASH.

Ainthorpe, near Danby. 500 O.D.—*Kendall & Muff.*

Bawtry.—*Culpin.*

Blackstone Edge. 5″ × 4″ × 3″.—*Whitehead.*

Elland.—*Spencer.*

Horbury.—*Burton.*

Kirk Sandall. From trench for South Yorkshire Junction Railway. 18″ × 13″ × 13″.—*Culpin & Grace.*

Mytholmroyd. In cutting sewage drain by bridge over Canal—numbers. —*Simpson & Howarth.*

North Dean, near Halifax.—*Spencer.*

Slippery Ford, 4 miles west of Keighley. 900 O.D.—*Gregory.*

Stanley, near Damstake at Kirkthorpe. 1½″.—*Fennell.*

Stapleton Park, 2½ miles south of Knottingley. 18″ × 10″ × 6″.—*Culpin & Grace.*

Thornes. In gravel pit in Miss Jubb's 32 acre field.—*Fennell.*

Tickhill (All Hallows Hill). 1′ cube.—*Culpin & Grace.*

Wakefield. East of Lancashire and Yorkshire Railway Viaduct to Goole, near Old Rifle Range. 4″ × 1″ × 1½″.—*Fennell.*

BROCKRAM.

Burstwick, 6 miles north east of Hull.—*Sheppard.*
Robin Hood's Bay. 8 averaging 5″ across.—*Sheppard & Muff.*
Runswick Bay. 12″ × 8″.—*Sheppard.*
Sawley Abbey. Swanside Beck. 14″ × 7″ × 6″.—*Tate.*

BUTTERMERE GRANOPHYRE.

Battyeford. 153 O.D.(2)—*Carter.*
Brearley. 285 O.D. 6″×5″×4″.—*Law.*
Dewsbury. Savile Town Gasworks. 125 O.D.—*Tate.*
Elland.—*Spencer.*
Horbury.—*Burton.*
Kirkthorpe. In river dredgings near dam.—*Fennell.*
Millwood, near Todmorden. In excavation for Gasometer tank. 48″×24″ ×24″; 24″×18″×13″; 14″×14″×12″.—*Law.*
Mytholmroyd. 300 O.D. 10″×7″×7″.—*Howarth & Simpson.*
North Dean.—*Spencer.*
Thornes. Near junction of Canal with river. 6″×5″×4″.—*Fennell.*
Thornes. Gravel pit in Miss Jubb's 32 acre field.—*Fennell.*
Walsden Valley. Far Hollingworth. 750 O.D. 14″×12″×9″.—*Law.*

ENNERDALE GRANOPHYRE.

Battyeford. (3)—*Carter.*
Dewsbury. Savile Town Gasworks. 125 O.D.—*Tate.*
East Gawber Colliery, near Barnsley. In boulder clay, 6′ thick, 250 O.D. 25″×19″×14″.—*Hemingway.*
Elland.—*Spencer.*
Horbury Edge. 100 O.D.—*Tate.*
Millwood, near Todmorden. In excavation for Gasometer tank. 36″×35″ ×24″; 24″×24″×16″; 12″×10″×8″.—*Law.*
Mirfield.—*Spencer.*
Mytholmroyd.—*Howarth & Simpson.*
North Dean.—*Spencer.*
Sowerby. Near to Church. 700 O.D. 3″×2″×2″.—*Saltonstall.*
Walsden Valley. Long Lee Quarry. 900 O.D. 10″×7″×4″.—*Law.*
Wakefield. Thornes Lane. 76 O.D.—*Tate.*

ESKDALE GRANITE.

Battyeford. (4)—*Carter.*
Elland.—*Spencer.*
Horbury.—*Burton.*
Kirkthorpe. In river dredgings, near dam.—*Fennell.*
Luddendenfoot. Hand Carr. 500 O.D. 5″×3″×3″.—*Saltonstall.*
Millwood, near Todmorden. In excavating for Gasometer tank. 28″ ×10″×8″; 10″×6″×6″; 24″×18″×18″; 18″×18″×12″; 10″×6″ ×6″.—*Law.*
Mytholmroyd.—*Howarth & Simpson.*
Sowerby. Near Church. 700 O.D. 3″×2″×2″. In Boulder Clough, Clogging Lane. 600 O.D. 5″×4″×3″.—*Saltonstall.*
Stanley. Near Damstake at Kirkthorpe. (3).—*Fennell.*
Thornes. Near junction of Canal with river. (5).—*Fennell.*
Thornes. Gravel pit in Miss Jubb's field. (13).—*Fennell.*
Walsden Valley. Long Lee Quarry. 900 O.D. 12″×11″×8″; 12″×9″ ×5″.—*Law.*
Wakefield. East of L. & Y. R. viaduct to Goole, near Old Rifle Range (2) —*Fennell.*
Wakefield. In bend of river near where Canal starts opposite Kirkthorpe (3).—*Fennell.*

EYCOTT HILL DOLERITE.

Dimlington.—*Stather.*

CARROCK FELL GABBRO.

Dimlington.—*Stather.*

Irby-on-Humber (Lincolnshire).—*Parker & Smith.*

Tees Side. At North Ormesby and South Bank, in boring 30′ to 120′ deep. —*Tate.*

Upsall. Hag's Hill, near Thirsk.—*Hall.*

QUARTZ PORPHYRY.

(St. John's Vale).

Balby, near Doncaster. Pit belonging Doncaster Brick Company. 14″ × 11″ × 8″.—*Corbett & Kendall.*

MICRO-GRANITE.

(Threlkeld).

Church Carlton, near Barnsley.—*Hemingway.*

Royston. Back Lane in yard west of Pecketts. 260 O.D. 12″ × 9″ × 7″; 12″ × 12″ × 6″.—*Tate.*

WHINSILL.

Brompton, near Northallerton.—*Hawkesworth.*

Carnaby. In digging a hole for a gate post in main street. 22″ × 19″ × 12″.—*Maule Cole.*

Flaxby. S. of Boroughbridge.—*Hawkesworth.*

Haselgrove to Marske Old Church. In boulder clay cliffs. 16″ × 14″ × 6″.

Irby-on-Humber (Lincolnshire).—*Parker & Smith.*

Saltburn and Skelton valleys, junction of. 18″ × 16″ × 13″.—*Hawkesworth.*

Skelton Beck. In stream bed just above North Eastern Railway Viaduct. 29″ × 26″ × 19″; 23″ × 16″ × 12″; 25″ × 13″ × 10″; 24″ × 22″ × 21″.—*Hawkesworth.*

Wighill, near Tadcaster.—*Hawkesworth.*

Wykeham.—*Hawkesworth.*

YEWDALE BRECCIA.

Horbury. 8″.—*Burton.*

Stanley, near damstake at Kirkthorpe. 2″ × 1½″ × 1″.—*Fennell.*

RHOMB-PORPHYRY.

Atwick. Foot of Cliffs.—*Sheppard,*

Ayton, near Scarborough.—*Hull Geological Society.*

Bessingby. 1½ miles S. of Bridlington Quay.—*Stather.*

Brandsburton. At Coney Garth, and Barf Hill Quarry.—*Walton & Stather.*

Brantinghamthorpe. 3″ × 2″ × 2″.—*Crofts.*

Brigham Hill, near North Frodingham.—*Walton.*

Brough. 100 O.D. Mill Hill Pit.—*Sheppard.*

Burstwick. 6 miles N.E. of Hull. 16′ below surface.—*Sheppard.*

Danby Junction of Ewe Cragg Beck and Black Beck. 625 O.D.—*Kendall & Muff.*

Dimlington. 18″ × 14″ × 14″. Cliff Foot.—*Stather & Crofts.*

Driffield. In Highfield Quarry.—*Maule Cole.*

Easington. 5″ × 4″ × 3″. From Beach.—*Stather & Crofts.*

Easington High Moor, Seavy Slack. 700 O.D.—*Kendall & Muff.*

Ferriby Common, near Hull. In chalky gravel pit on Humber side. —*Stather.*

Filey. 1 mile north of Brickfield on Scarborough Road.—*Stather.*

Flamborough. Brickfield west of Village.—*Stather.*

Garton on the Wolds. Craike Hill Quarry.—*Stather.*

Gristhorpe. Beach.—*Stather.*

Hornsea.—*Walton.*

Hutton Buscell, Vale of Pickering.—*Hull Geological Society.*

Kirk Moorgate, near Robin Hood's Bay. 550.—*Stather.*
Meaux, near Beverley.—*Sheppard.*
Middleton on the Wolds. In gravel and sand pit. 150 O.D.—*Hull Geological Society.*
Patrington. From Beach.—*Stather & Crofts.*
Peak. 600 O.D.—*Stather.*
Redcliffe. Bank of Humber, 6 miles west of Hull.—*Stather.*
Robin Hood's Bay. Beach. 12″ × 10″; 7″ × 6″.—*Sheppard & Muff.*
Rudstone. 1½ miles north. Quarry in Gypsey Gravels.—*Stather.*
Seamer, near Scarborough.—*Hull Geological Society.*
Speeton. Moraine on which Speeton Mill stands.—*Stather.*
Staithes.—*Kendall.*
Stump Howe. 8 miles west of Whitby. 650 O.D.—*Stather.*
Wawne, near Hull.—*Fraser Robinson.*
West Rigg, near Lockwood Reservoir. 810 O.D. In situ in boulder clay. —*Stather.*
Willerby, near Hull. 150 O.D.—*Sales.*
Yedmandale, near West Ayton.—*Sheppard.*

AUGITE-SYENITE.

(Laurvikite of Brögger).

Atwick. 18″ × 18″ × 12″. At foot of Cliffs.—*Stather.*
Dimlington. 18″ × 15″ × 15″.—*Stather & Crofts.*
Elloughton. Brough. 12″ × 15″ × 18″. 100 O.D. Mill Hill Quarry. —*Stather.*
Flamborough. Thornwick Bay. 4″ × 3″ × 3″.—*Stather.*
Redcliff. On Humber Bank, 6 miles west of Hull.—*Stather.*
Robin Hood's Bay. 4½″ × 3½″.—*Sheppard & Muff.*
Saltburn.—*Kendall.*

ELÆOLITE-SYENITE. NORWAY.

(Foyaite of Brögger).

Burstwick, Holderness. 5″ × 4″ × 4″.—*Stather.*
Filey. Boulder clay on Carr Naze.—*Stather.*
Kettleness, near Whitby. On Beach.—*Hawkesworth.*
Whitby. On Beach. Exactly resembling that of Kvelle, near Larvik, Southern Norway.—*Kendall & Muff.*

POST-ARCHÆAN GRANITE.

(From Angermanland or Åland, Gulf of Bothnia).

Easington.—*Crofts.*
Dimlington. 10″ × 5″ × 5″.—*Stather.*
Holderness. From clays. Recognised by Dr. Munthé, of Upsala University.—*Stather.*

HALLÉFLINTA. SWEDEN.

Holderness. From clays. Recognised by Dr. Munthé, and Smaland suggested as possible source.—*Stather.*

ZIRCON SYENITE. SOUTHERN NORWAY.

Dimlington, Holderness.—*Stather.*

SYENITIC DYKE-ROCK.

Stonegate, Eskdale. In valley cutting above Stonegate. From Longen Valley or north of Christiania. Recognised by Prof. Brögger of Christiania.—*Kendall & Muff.*

GABBRO.

(Similar to Imenaes, Norway).

Egton, Eskdale. 'Probably Norwegian.' Prof. Brögger.—*Kendall & Muff.*

GNEISS-GRANITE.

Gristhorpe.—*Howarth & Simpson.*

OLIVINE DOLERITE.

(Similar to that of Fans, N.B.).

Hornsea.—*Glauert.*

PORPHYRITES, CHEVIOT-TYPE.

Barton-on-Humber (Lincs.). In glacial gravels. 12″ in diameter.—*Hull Geological Society.*

Bluestone Bottoms, near Little Weighton. 250 O.D.—*Macturk.*

Bold Venture. 825 O.D.—*Kendall & Muff.*

Carlton Bank. 925, 950 O.D. On watershed.—*Kendall & Muff.*

Cherry Burton, near Beverley. In boulder clay, ½ mile east of Station.—*Stather.*

Etton, near Beverley. In strong boulder clay at east end of village.—*Hull Geological Society.*

Gardham, near Beverley. In shallow pit west of village.—*Hull Geological Society.*

Goathland. In red boulder clay near Scarr Wood. 480 O.D.—*Kendall & Muff.*

Green Dyke. 825 O.D.—*Kendall.*

Gristhorpe.—*Howarth & Simpson.*

Hutton Buscell. In gravel pit on 200′ contour.—*Kendall.*

Kettleness, near Whitby. On beach, just south of Kettleness.—*Hawkesworth.*

Leconfield, near Beverley. In old gravel pit east of Pump Bridge.—*Stather.*

Meaux, near Beverley.—*Sheppard.*

Middleton-on-the-Wolds. In gravel pit, west end of village.—*Stather.*

Moss Dyke, Goathland.—*Kendall & Muff.*

Scarth Nick.—*Kendall.*

Seamer. In glacial gravel pit near Station.—*Hull Geological Society.*

Thirsk.—*Hall.*

Upsal (Hag's Hill), near Thirsk.—*Hall.*

Wawne, near Hull.—*Fraser Robinson.*

Wykeham (Vale of Pickering). From gravel pit in sand pit behind Downe Arms Hotel.—*Hull Geological Society.*

Yedmandale. In gravel pit.—*Kendall.*

MAGNESIAN LIMESTONE.

(Roker-type and Sunderland-type).

Barton-on-Humber (Lincs.). In glacial gravels.—*Hull Geological Society.*

Hutton Buscell. In gravel pit on 200′ contour.—*Kendall.*

Peak Station. 650 O.D.—*Kendall & Muff.*

Robin Hood's Bay. (Roker type). Both in clay and on beach.—*Sheppard & Muff.*

Seamer. In glacial gravel pit near Station.—*Hull Geological Society.*

HAGGIS ROCK. SOUTH SCOTLAND.

Aldborough, Holderness.—*Walton.*

Hayburn Wyke.—*Walton.*

Robin Hood's Bay. Upper boulder clay.—*Muff & Sheppard.*

TRACHYTE. EILDON HILLS, MELROSE, N.B.

Bridlington.—*Kendall.*

Burstwick.—*Kendall.*

OLD RED SANDSTONE. SCOTLAND.

Robin Hood's Bay. Beach boulder.—*Muff & Sheppard.*

Whitby. In lower boulder clay. Lower old red sandstone.—*Muff & Sheppard.*

QUEENSBURY GRITS.

Southern Uplands of Scotland.

Stonegate, Eskdale.—*Muff.*

RED JASPER.

(Radiolarian Chert).

Southern Uplands of Scotland.

Gristhorpe.—*Howarth & Simpson.*
Robin Hood's Bay. Beach boulder.—*Muff & Sheppard.*
Settrington (Vale of Pickering).—*Kendall.*

LENY GRITS.

(Highland Schists, Perthshire).

Robin Hood's Bay. Upper boulder clay and beach.—*Muff & Sheppard.*
Stonegate, Eskdale (?)—*Muff.*

BEN LEDI GRIT.

(Highland Schists, Perthshire).

Egton Brick Works, Eskdale.—*Muff.*

EPIDIORITE.

(Highland Schists, Perthshire).

Robin Hood's Bay. Beach boulder.—*Muff & Sheppard.*

MOINE SCHIST.

Highlands.

Robin Hood's Bay. Upper boulder clay.—*Muff & Sheppard.*

(*To be continued*).

Mr. R. H. Yapp has an interesting paper on the 'Vegetation of Wicken Fen' in the 'New Phytologist' (Vol. 7, parts 2 and 3.)

We see from the newspapers that a North-Eastern Railway Natural History and Scientific Society has been formed, with a membership of thirty-two. Mr. W. Hewett, of York, is a prominent member.

Lord Avebury has introduced a Bill in the House of Lords with the object of checking 'the wanton and wholesale destruction of birds which is being carried on everywhere throughout the British Empire, and in all parts of the world, without regard to their agricultural, educational, and æsthetic value.' Lord Avebury's Bill, which it is proposed shall come into operation on January 1st next, prohibits the importation into the United Kingdom, for the purpose of sale or exchange, of the plumage, skin, or body of any wild bird. Ostriches, eider-ducks, and wild birds used as articles of diet are the only exceptions.

Our readers will learn with interest the appointment of Dr. William G. Smith to the lectureship of Biology in the Edinburgh and East of Scotland College of Agriculture. In the eleven years during which Dr. Smith has been connected with the botanical and agricultural departments of the University of Leeds, he has made a deep and lasting impression on the botany and botanists, not only of Yorkshire, but of Britain as a whole. His work on botanical survey is widely known, and Yorkshiremen have been fortunate in having such an excellent worker in their midst. While we cannot but regret his removal, and the consequent loss to the county, all will extend to him the sincerest wishes for a successful career in his new sphere.

REVIEWS AND BOOK NOTICES.

Petrology for Students: An Introduction to the study of rocks under the Microscope, by **Alfred Harker, M.A., F.R.S., F.G.S,** (Fourth Edition, revised). Cambridge: The University Press, 1908. 336 pp.

When this handbook was first published, thirteen years ago, it at once became popular amongst students of petrology. The fact that four editions have been called for in so short a time speaks well for its continued popularity. Mr. Harker, who was at one time on the editorial staff of this journal, and a contributor to these pages, is well known to our readers for the thorough and painstaking nature of his work. The present edition has been revised throughout, and a number of new illustrations have been added.

Three further **Hull Museum Publications** have been received. The first (No. 48) is an index to the first forty-seven publications, and contains some two thousand references to specimens figured and described in these volumes. Publication No. 51 is the 24th Quarterly Record of Additions, and contains articles on mediæval tiles discovered in Holy Trinity Church, Hull, (illustrated), Antique Forgeries, Hull's early plays of Dickens, scarce engravings, etc., etc. Publication No. 52 contains Mr. Sheppard's papers on Fossil Fish etc., from the Chalk, and Pre-historic Remains from Lincolnshire, reprinted from the columns of the 'Naturalist.'

'The Development of *Agaricus campestris,*' by **Prof. G. F. Atkinson,** Cornell University.*

In this, Prof. Atkinson discusses the origin, growth, and gradual differentiation of the several parts composing the sporophore or 'fruit body' of *A. campestris*, and, incidentally, a few other species. It is pointed out that the first formation of the young sporophore is an ovate or broadly elliptical ball, consisting of a collection of slender, homogeneous, densely intermingled hyphal threads, surrounded by a thin layer of looser texture—the universal veil. The latter continues to grow until the formation of the pileus, stem, and gills has been established, when its function ends. The first indication of the origin of the hymenium in the ball of hyphæ appears, in stained longitudinal sections, as two deeply-stained spots, comparable to a pair of eyes; here the hyphal threads while still being similar in outline to those of the other parts of the ball, are much richer in protoplasm, hence the deeper stain. This continues as a ring around the upper part of the elongated ball; later, a cavity—the gill cavity—is formed along its course, which enlarges with the growth of the young sporophore. Rudimentary radial ridges begin to form on the roof of the cavity simultaneously with the commencement of the differentiation of the pileus and stem.

The further development of the various parts of the sporophore is closely followed and described. Previous investigations in the same direction by Nees Von Esenbeck, Schmitz, Bonorden, Hoffman, De Bary, Hartig, Brefeld, Worthington G. Smith, Fayod, and others are summarised and discussed. So far as one can gather, very little work of this kind has been done during the last twenty years. The study of the development of the Hymenomycetes is much behind that of some other groups of fungi, and nearly all other groups of plants. This may be partly accounted for by the difficulty of obtaining material supplying the unbroken series of closely successive stages of development necessary for thoroughly working out the investigations. It is only on rare occasions that a series of wild material can be procured, hence a cultivated form had to be resorted to by Prof. Atkinson. *Armillaria mellea* may supply it sometime.

C. CROSSLAND.

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* A reprint from 'The Botanical Gazette,' University of Chicago Press.

Messrs. Cassell & Co., who have done so much to popularise science, are now publishing a beautiful natural history work in fortnighty parts, viz., **'British Birds' Nests:** how, where and when to find and identify them,' by R. Kearton, with illustrations by C. Kearton, and with coloured plates of eggs. The work is to be completed in sixteen fortnightly parts, at one shilling each, and judging from the three already received, the work bids fair to be exceedingly cheap. The plates of eggs, printed by the three-colour process, are excellent.

Truth: Experimental Researches about the Descent of Man, by **H. M. B. Moens.** London: A. Owen & Co., 1908. 26 pp., 1/-

In this pamphlet the author outlines some extraordinary experiments he proposes to make with anthropoid apes and negroes in the region of the Congo. The results of these experiments he hopes will have a great bearing upon the origin of the human species. The object of the pamphlet is an appeal for funds, and we would recommend the matter to the notice of those interested in experiments of this nature.

The Report of the Scarborough Philosophical and Archæological Society for 1907 is to hand.

It is good news to learn that the society has a substantial balance in hand, and that for ' the first time for twenty-three years, bank interest has been received.' Some much-needed improvements in the Museum and Library have been made—the latter now being a very useful and valuable asset. The publication includes the Report of the **Scarborough Field Naturalists' Society** in which are many valuable local natural history records. Mr. W. J. Clarke's Zoological notes are particularly interesting. We are glad to notice that the committee has determined to prevent, even by legal action, if necessary, the destruction of wild flowers in the district.

Proceedings of the Darlington and Teesdale Naturalists' Field Club, Vol. I. Edited by **A. C. Boyde.** 1907 [published Jan. 1908], 120 pp., plates, price 3/-

In his presidential address to the Darlington Society last year, Mr. J. Turnbull reviewed the work which had been accomplished by the Club since its formation in 1891. A wish was then expressed that some permanent record might be made of the Club's proceedings. Mr. Boyde was appointed editor, and with the valuable help of Mr. Edward Wooler, the present publication has been produced. Our Darlington friends are to be thanked for placing on record so many important facts, and congratulated upon producing so interesting a volume. It is well that the record has been made whilst there was the opportunity. The volume commences with a list of the lectures delivered to the Society, which is followed by memoirs of the late James I'Anson and Dr. Taylor Manson. These are accompanied by photographs. There are also portraits of Messrs. A. C. Dixon, E. Wooler J. Turnbull, W. Lear, and G. H. S. Hampton. Mr. Turnbull's presidential address, already referred to, is printed, and there are summaries and abstracts of other papers, many of great local value. We regret that space does not enable us to enumerate all the items, but the following will give an idea of their nature :—' Outlines of the Geology of Darlington,' by [the late] R. Taylor Manson ; ' Life on a Window Pane,' Rev. W. J. Wingate ; ' Coal and Coal Formation ' ; and ' The Antiquity of Man,' by J. Turnbull ; ' Bulmer's Stone, Darlington,' by A. Haward ; ' Phallic Worship,' and ' The Romans in and around Darlington,' by Edward Wooler ; ' The Cleveland Dyke ' [with analyses] by S. Smith ; ' The Ordnance Survey of Great Britain,' by J. A. Woodward, etc., etc. There is also a ' Local Plant List (common varieties omitted) ' by T. M. Thompson, which would have been much more valuable had the area defined by the word ' local ' been given ; and a ' List of the Club's collections ' [geological, etc.], by S. Smith. We were surprised to find the imprint ' Norwich ' on the cover and title of this publication, and can only presume the Darlington printers were not able to do the work cheaply.

CORRESPONDENCE.

Dates of Publication.

To the Editors of the 'Naturalist.'

Dear Sirs,

Let me hasten to remove Dr. Bather's sadness, if not his surprise, by informing him that it is my intention to adopt his suggestion in future issues.

I was not aware that any such circular as the one to which he refers had been issued, or that any correspondence had passed between him and my predecessor on the subject.

As regards my interpretation of the date placed on the cover, Dr. Bather is correct in assuming that it was in his third sense that I employed it, and I must acknowledge in this connection that about one-sixth of the part was occupied by the Secretary's report relating to the previous year, but, as regards the original papers about which alone questions of priority could arise, the date was a correct one, in the sense in which it was employed.

I may perhaps be forgiven for assuming that your reviewer referred to grievances on the part of authors whose papers appeared in the Proceedings in question, inasmuch as he singled out one of these authors for special mention in this connection in the paragraph to which my previous letter referred.

Yours etc.,

Arthur R. Dwerryhouse.

NORTHERN NEWS.

The Manchester Geological and Mining Society has issued an Index to the first twenty-eight volumes of its transactions. This will prove a valuable addition to the publications of their society.

Some time ago we ventured to differ with the Editor of a certain paper, who thought that the word ' mammals ' was improper, and he stated that in future he would refer to ' animals ' instead. He has now gone to the other extreme, and under ' mammals ' includes the Peregrine, Harrier, Willow-Tit, White-winged Larks, and Raven !

A visitor to the Public Museum at Mansfield recently noticed that the collection was very ' strong ' in birds—probably the Curator is a taxidermist. Amongst the specimens arranged in rows on shelves, he noticed eight green woodpeckers, four great-spotted woodpeckers, nine long-eared owls, six barn owls, five ptarmigan, four quails, twelve corncrakes, nine black-headed gulls, six lapwings, five razorbills, eight jays, and sixteen kingfishers ! The birds were not selected to show varieties of plumage, etc., but apparently represent the trophies of the local ' sportsmen.' There were twelve pairs of ' Pinna rudis, the largest known British specie of shell,' and over thirty examples of Gryphœa incurva !

Lord Rayleigh has been chosen Chancellor of Cambridge University, in succession to the late Duke of Devonshire.

In our note in reference to Sir John Evans, in the March 'Naturalist,' it should have been stated that Sir John was in his eighty-fifth year.

The Rev. Canon Fowler's note on '*Hydnum auriscalpium* in Lincs.' (ante p. 157), should have been headed '*Hydnum auriscalpium* in *Notts.*' The specimen was from Creswell, near Welbeck Abbey,

The York and District Field Naturalists' Society has been dissolved, and reconstructed. The new society seems to be practically the same as the old one, excepting that a prominent member in the old society is not on the list of the new one.

Those in search of cheap 'degrees' will be glad to learn that the B.E.N.A. subscription has been dispensed with, and the penny per annum formerly required, need not now stand in the way of any who are 'qualified,' though too poor, to B.E.N.A.

How to warm boots:—Drop two or three hot cinders inside the boots to be put on. A 'hint' given in a 'natural history' journal by a person named 'Kyd.' The editor of the same journal, speaking of the sufferings of animals, modestly writes: 'to me, who have studied the matter as deeply, I think, as any man of my age,' etc.

Prof. W. Boyd Dawkins, F.R.S., who has held the Chair of Geology at Manchester since 1874, has announced his intention of resigning at the end of the present session. Prof. Dawkins first went to Manchester as the Curator of the Museum in 1869. He will continue to take an interest in the affairs of the Manchester University and its Museum.

Mr. W. Mansbridge gives the name *ochrearia* to a variety of *Amphidasys betularia* from St. Anne's-on-Sea ('Entomologist' for May). Of course we presume there is sufficient grounds for this addition to our nomenclature, or our contemporary would not have published the note. It does, however, seem a little unsatisfactory to give a new name on the strength of a single specimen, which may, or may not be 'likely at any time to recur.' With a species such as *Amphidasys betularia*, it would be quite an easy matter for a man 'with a microscopic eye' to find a difference in, and give a name to, almost every specimen.

A Conference of Lancashire and Yorkshire Museum Curators was held at the Harris Museum and Art Gallery, Preston, on April 11th, and was well attended. Dr. W. E. Hoyle (Manchester) read a paper on 'Children's Museums,' in which he described some American Institutions; and Mr. W. E. Barton read some notes on 'The Equipment of an Art Gallery and Museum.' Exhibits of interest to Curators were handed round by Messrs. Madeley (Warrington), Midgley (Bolton), and Mosley (Keighley). The members were well pleased with the palatial building and its wealth of charming art treasures. Those interested in natural history, however, saw room for improvement, and the lack of the *local* element in the collection was deplored.

It is pleasing to find that 'The Graphic' now regularly publishes 'a Chronicle of Science,' and in other ways gives prominence to scientific matters of general and real interest—not the rubbish of which we see so very much now-a-days, under the head of 'Nature Study.' In the issue before us the Chronicle refers to the British Association meeting at Winnipeg, in 1909, the Perkin Medal, Mimicries in the Plant World, Lord Kelvin's latest work, Lord Lister's eighty-first birthday, etc. The notes are suitably illustrated. Elsewhere in the same publication is an illustrated account of the removal of the world's greatest Meteorite, the 'Ahnighito' or Cape York Meteorite, now in New York; a paragraph relating to the new Chancellor of Cambridge University (with portrait), etc.

30 MAY 1908

BRITISH MUSEUM

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BRITISH MUSEUM NATURAL HISTORY

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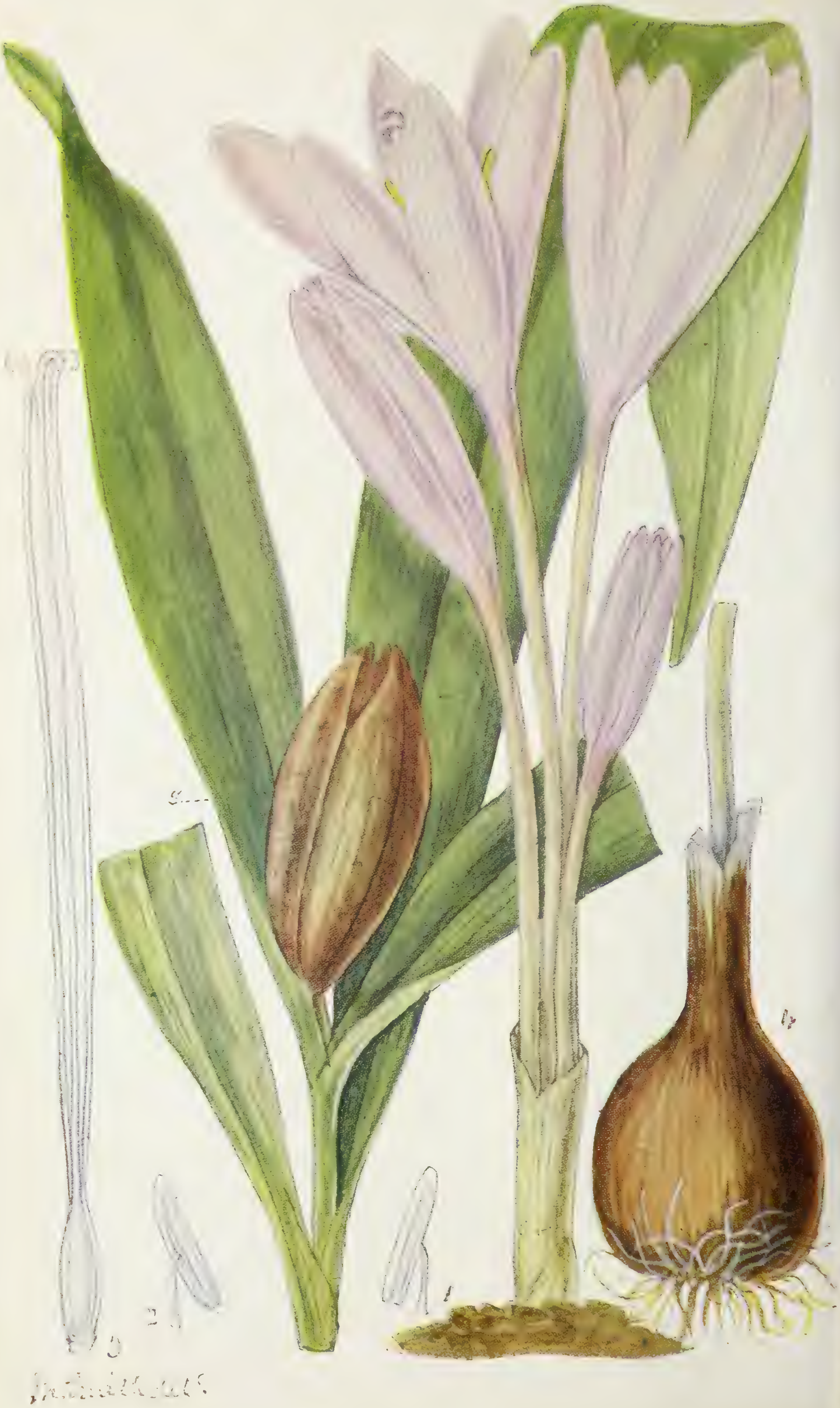

Meadow Saffron.

NOTES AND COMMENTS.

OUR MARINE FAUNA.

The Rev. Canon A. M. Norman, LL.D., F.R.S., etc., has favoured us with a copy of his Presidential Address, delivered to ' The Hertfordshire Natural History Society and Field Club ' on April 25th last. This is entitled ' The Celtic Province, its Extent, and its Marine Fauna.' In this Canon Norman discusses many interesting problems connected with the occupants of the seas surrounding Britain, and particularly refers to the periodical migrations of *Euthemisto compressa*, a small crustacean which is occasionally washed up in large quantities at Redcar and other places on the Yorkshire coast, as already recorded in this journal. The author appeals for further workers on the coast, and in this we trust his appeal will not be without avail. On the Yorkshire coast there is ample opportunity for research, and it seems a pity that this interesting study has not more followers.

AN AGRICULTURAL JOURNAL.

With the first part of volume xv. of the Journal of the Board of Agriculture, that interesting and useful publication is increased in size, though the nominal price of fourpence remains the same. The part for April is before us, and contains many items of interest to our readers. Sir W. T. Thiselton Dyer writes on the supposed Degeneracy of the Potato ; Mr. W. P. Wright deals with the Pruning of Established Fruit Trees, and there are notes on Insect, Fungus and other pests, soil surveys, varieties of apples, etc. A paper on the Meadow Saffron or Autumn Crocus (*Colchicum autumnale*) is illustrated by a coloured plate, which the Controller of His Majesty' Stationery Office kindly permits us to reproduce. (Plate xxi.).

MEADOW SAFFRON.

The ' Meadow Saffron is a plant belonging to the order Liliaceæ, with flowers closely resembling crocuses,' we learn. ' The leaves are lanceolate in shape, dark green in colour, and several inches in length ; they are fully developed in spring, dying down during the summer. Although flowering takes place from August to October, the blooms soon die. The Autumn Crocus, known also as meadow crocus, naked ladies, etc., is poisonous in all its parts. ' Experiment has shewn that from 3 lbs. to 5 lbs. of green leaves and seed vessels are necessary to act fatally upon a cow ; the poison, however, appears to be cumulative, and a small quantity eaten each day with other food for a few days may lead to fatal results.' Particulars are given of the best methods for exterminating the plant. Fortunately it also grows in situations not favourable for grazing purposes, consequently botanists will still have the pleasure of seeing the plant without feeling that it is their duty to exterminate it.

NOTE ON A BRITISH BURIAL AT MIDDLETON-ON-THE WOLDS.*

J. R. MORTIMER.

On June 1st, 1905, Mrs. Broadley Soane, of Middleton-on-the-Wolds, wrote to me to the effect that another skeleton had been found in the sand-pit, together with a vase and a flint dagger. On June 3rd I visited the pit, but by that time nothing remained in sight. There was a skull, in many fragments, and the broken bones were in a heap at the pit side. The left femur was the only bone sufficiently perfect to be measured, and this was 19¾ inches in length, evidence that the owner was a little over six feet in height. The skull has been pieced together, and gives a cephalic index of .665. The supraciliary ridges are fairly prominent.

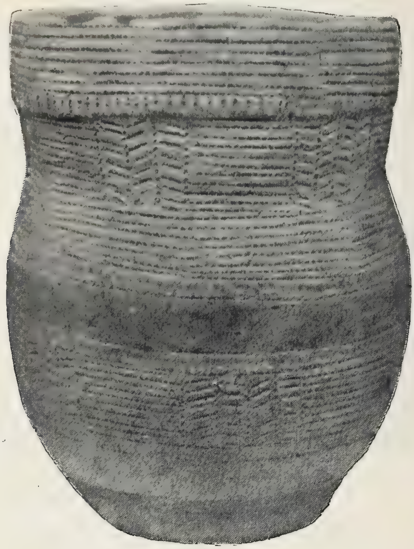

Fig. 1.

From what I could gather from Mr. Soanes, the body had been interred in a flexed position, on its left side, with the head towards the East. I was not able to ascertain the positions occupied by the accompanying relics.

The objects found with the interment include a 'drinking cup' or 'beaker,' some flint implements, and two jet buttons.

The 'drinking cup' (fig. 1) is 7½ inches in height, 5¾ inches in diameter at the top, 6 inches at the middle, and 3¾ inches at the bottom. It is freely ornamented in various patterns, the impressions being made by a notched tool.

---

* A supplementary note to page 354 of my 'Forty Years' Researches in British and Anglo-Saxon Burial Mounds of East Yorkshire.'

In contact with the base of this vessel had been placed a fine knife-dagger (fig. 2), 6½ inches in length, a broad flint flake (fig. 3), a punch-like worked flint, 2¾ inches long (fig. 4), and a lump of iron pyrites. Probably the last two were used as strike-a-lights; I have previously found similar objects in graves of this date. The pyrites had stained the flint dagger, partly eaten a hole in the side of the earthenware vessel near the bottom, and a fragment of pyrites was still adhering to the punch-like tool. From this it would appear that all the objects had been placed in close contact at the time of interment.

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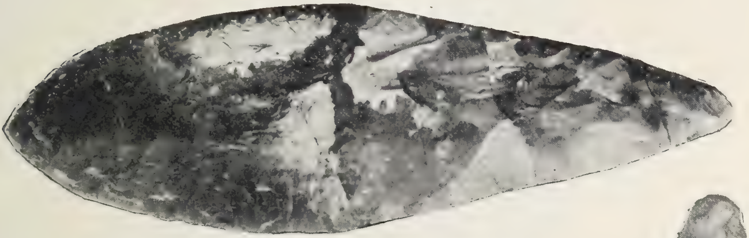

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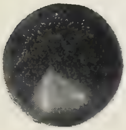

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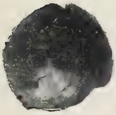

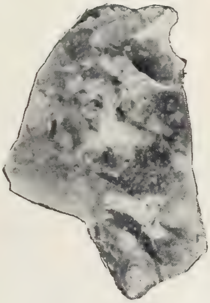

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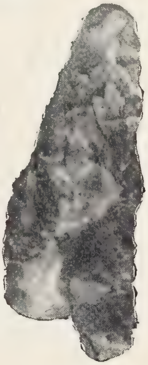

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A jet button, an inch and a quarter in diameter (fig. 5) and a bone pin, also accompanied the skeleton but the pin was lost. Subsequently a second button, of similar size, was found (fig. 6), which probably belonged to the same interment.

On August 17th and 18th, 1906, I excavated a considerable area adjoining the site of this burial, but nothing further was found.

The Middleton interment, with its accompanying relics, is almost identical with that found at Garton Slack.*

So far as I know, there are only six other instances recorded in England where a flint knife-dagger has been found together with a 'drinking-cup.'

---

* Body No. 6, Barrow 37, Group 11; see 'Forty Years' Researches.'

NOTE ON THE LOMBARDY POPLAR

(*Populus pyramidalis*, Roz.).

W. G. SMITH, Ph.D., and T. H. TAYLOR, M.A.

The Lombardy Poplar is one of the most erect of our deciduous trees, and resembles in this respect many of the non-deciduous group, such as the Spruce and Silver Fir. To a casual observer viewing a row of well-grown poplars, the phrase 'as straight as a poplar' seems well justified. A closer study of the characteristics of this tree shows, however, that it is not absolutely erect, but leans to one side like some other poplars, such as the Black Poplar. These trees, when growing in an open inland district, both lean towards the north-east. The degree to which they bend, is, however, not the same. In the case of the Lombardy Poplar, the angle that the trunk makes with the vertical is trifling, whereas in the case of the

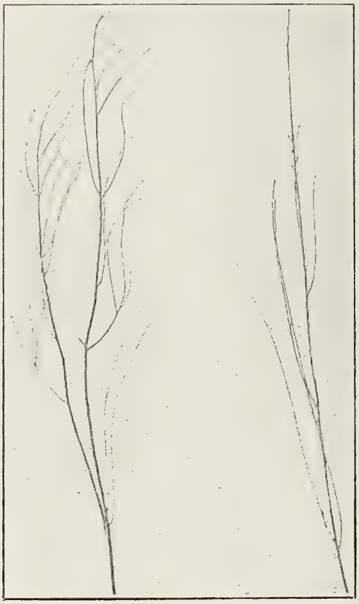

Fig 1.. Two branches from opposite sides of a young Lombardy Poplar; right-hand from south-west side, left-hand from north-east side. The figure represents in both cases a view taken from the north-west. From a photograph by E. E. Unwin, M.Sc.

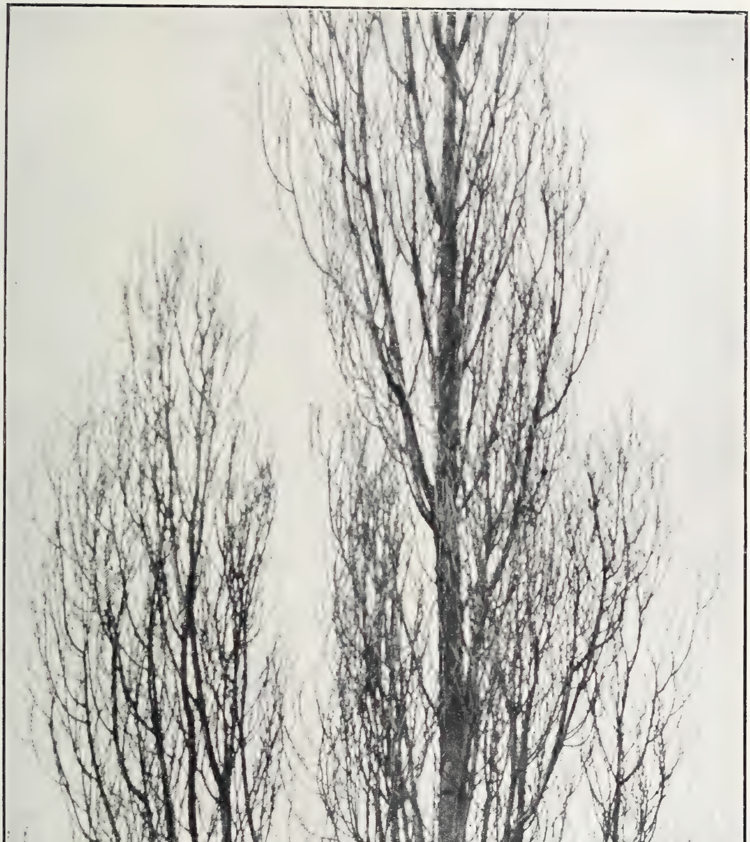

Photo by] [*E. E. Unwin.*

Portion of a Lombardy Poplar; photographed from the east. The twigs on both sides curve inwards.

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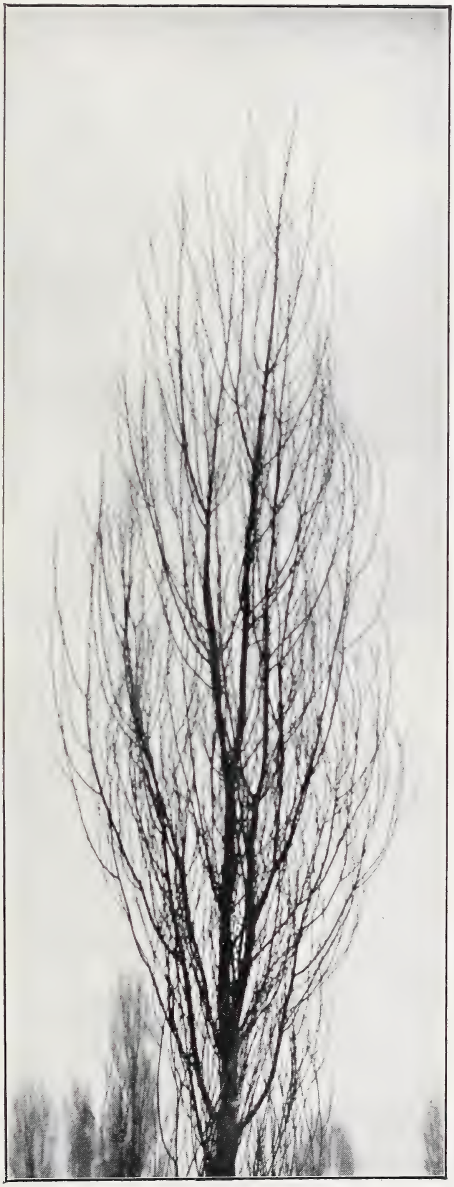


Photo by] [*E. E. Unwin.*

Upper half of a young Lombardy Poplar; photographed from the south-west. The twigs on the right (north-east) curve inwards, those on the left (south-west) are straight. The branches at the summit bend to the south-west.

BRITISH MUSEUM NATURAL HISTORY

Black Poplar, it is well-marked. Since the influence of the south-westerly winds is generally regarded as the cause of these trees becoming permanently bent, it is interesting to inquire why the Lombardy Poplar is almost erect, while some other poplars lean strongly to one side.

Früh* points out that in a tree, whose crown has been rendered asymmetric by the influence of a prevailing wind, the twigs on the windward side are ' shorter, curved, often spinose, and appear more or less blown in towards the crown, or are, at least, poorly developed.'

A well-marked feature of the Lombardy Poplar consists in the twigs being curved in such a manner that their tips point inwards towards the central axis of the tree. While this fact is well-known, a more detailed examination shows that it is not true of all the twigs of a given tree. It certainly holds good for the twigs situated on three sides ; those, however, on the fourth side, which is the side facing the south-west, do not bend inwards but are straight or even bent outwards (fig. 1).† This peculiarity in the twigs may be illustrated by holding up one's open hand, and gently flexing the fingers to represent the curved twigs, and strongly extending them to represent the straight ones.

The difference in the behaviour of the twigs situated on the south-west side, influences the symmetry of the tree as a whole : there is only one plane along which it can be divided into two similar halves. This plane is vertical, and lies in a south-west and north-east direction. An observer viewing the tree from either of these aspects, finds that the twigs on both sides curve inwards towards the axis, and give to the general shape a fairly symmetrical appearance (plate xxiii.). If, however, he views the tree from a direction at right angles to this plane, that is from either the south-east or the north-west, he will notice that the twigs on one side are curved as before, while those on the other side are straight, or nearly so, and that, in consequence of this difference, the appearance of the tree is rendered asymmetric (plate xxiv.).

The Lombardy Poplar exhibits a further feature of interest. The tips of the leading branches situated at the summit of the tree do not, like the trunk itself, bend towards the north-east, nor do they point vertically upwards. They take, on the other hand, a rather unexpected course, and bend towards the south-west (plate xxiv.). In a row of young poplars this feature, repeated tree after tree, is often very striking.

---

* T. Früh: Die Abbildung der vorherrschenden Winde durch die Pflanzenwelt.—Jahr. Geo-Ethn. Geo. Zürich, 1901-2.

† The photographs from which the illustrations are taken, were obtained during March and April of the present year.

We thus find that the regularity with which the Lombardy Poplar is often credited, is disturbed by three features :—(1) the main trunk is not perpendicular, but bends to the north-east ; (2) the twigs situated on the south-west side do not curve inwards like those on the other sides ; (3) the branches at the top of the tree bend in an opposite direction from the main trunk.

These observations have been carried on only for a limited time, and it is impossible to say how far they will hold good for other seasons and other places. It is thus too soon to draw any conclusions as to the meaning of the peculiarities described. If, however, they should prove to be generally applicable, the following questions will arise :—What advantage does the Lombardy Poplar derive from the fact that the branches at the summit, and the twigs lower down on the south-west side all bend towards the south-west ? Does this feature enable the tree to resist the action of the south-west wind, which exacts so heavy a toll from some other species such as the Black Poplar ? What is the nature of the stimulus in response to which some of the twigs bend towards the south-west ?

◆

M. Albert de Lapparent, the well-known French geologist, died early in May. He was sixty-seven years of age, and took part in the Geological Society's centenary celebrations in London not long ago.

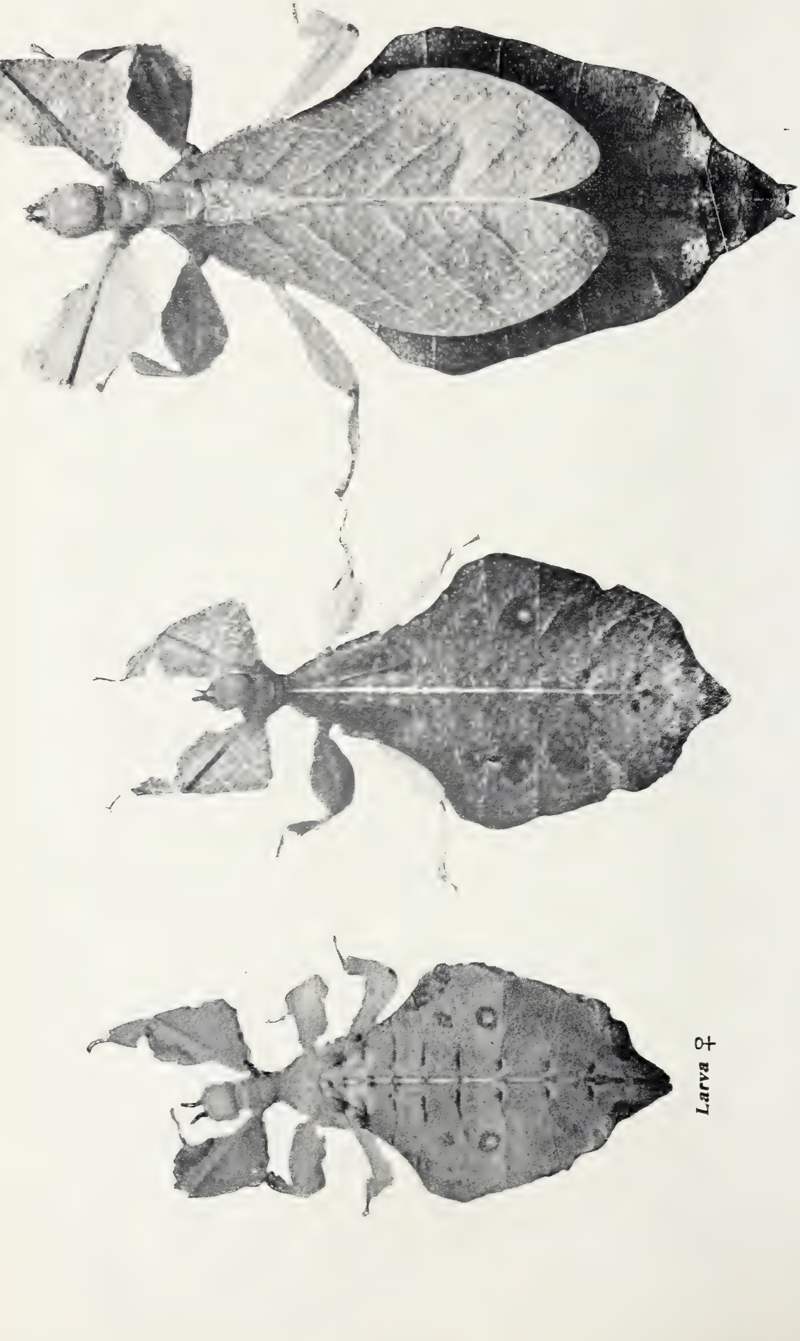
Mr. W. Bateson, M.A., F.R.S., fellow of St. John's College, Cambridge, and son of the late Dr. Bateson, master of that college, has been elected to the newly-established professorship of Biology at Cambridge.

In the May 'Geological Magazine' Mr. L. Moysey has a paper on 'A Method of Splitting Ironstone Nodules by means of an Artificial Freezing Mixture.' By freezing the nodules, he appears to have obtained some excellent results.

'The Glaciation of East Lothian South of the Garleton Hills' is the title of a memoir recently issued in the 'Transactions of the Royal Society of Edinburgh.' It is by Professor Kendall and Mr. E. B. Bailey, and is a continuation of the work commenced by Professor Kendall on the Cleveland Hills a few years ago.

Those who have read Mr. A. Whitaker's papers on the habits of bats, which have appeared in these columns from time to time, will be interested in some 'Notes on the Greater Horseshoe Bat in captivity,' by Mr. T. A. Coward, in the 'Memoirs and Proceedings of the Manchester Literary and Philosophical Society,' volume lii. part 2.

BRITISH MUSEUM NATURAL HISTORY



Imago ♀

Nymph ♀

Larva ♀

Leaf-Insects.

NOTES ON THE LIFE-HISTORY OF THE LEAF-INSECT.

W. H. ST. QUINTIN,
Scampston, E. Yorks.

Although I have already * described some examples of a species of Leaf Insect, *Pulchriphyllium crurifolium,* which I have had under my observation for just two years, I venture to send some further account of these very interesting insects, partly because there probably are some readers of the 'Naturalist' who do not see the 'Entomologist,' and also because I am able now to give photographs which more fully illustrate the life-history of the insect than those which I secured last year. But first perhaps I may say a few words about some other members of the same order. Many of the orthoptera make attractive subjects for observation in captivity—a sunny window, and some provision for excluding cold draughts is all that the European species of *Mantis* and *Bacillus* (Stick Insects) require in their later stages. But in this country some artificial heat is desirable for the young specimens, or their appetites fail, and growth becomes slow. And plenty of sunlight is at all ages indispensable. I generally myself have, from March to October, examples of *Bacillus rossii* feeding on the golden-flowered *Genista fragrans* of our conservatories, and a few *Mantis empusa,* and sometimes *M. religiosa.* The former can easily be found along the Riviera in the spring, and being then well-grown, gives little trouble. Either of our cabbage butterflies or blue bottle flies are readily taken, and the scarcely suppressed excitement with which the Mantis watches its prey approaching, slowly turning its head the while, and the dexterity with which it grips the victim when within reach of those deadly forelegs, is a strange sight. *M. religiosa* does not hatch out till March-April, and the young, which may be beaten off the tree-heath (Bruyère) in the latter month are not very easy to feed. Small enough flies are difficult to find so early in the year. But the larvæ seem to be only partly carnivorous at first, and will sip honey and water offered to them on a fine grass bent, and when they assume predatory habits, will take aphides, and presently small house-flies. I have never been able to breed Mantis. The female is altogether more powerful than the male imago, and in my experience, is more inclined to make a meal off him than to accept his attentions. But there is no difficulty in obtaining ova from the European *Bacillus rossii*, though I have never either found in the wild state, nor bred a male of this species. I have, for three successive summers, had broods from wild-caught females (by parthenogenesis), and then the race dwindled in numbers, and finally ceased to propagate. At the Zoological Gardens in Regent's Park, from the same original stock which I presented to the Society, I believe the insects were kept going for one more year, that is, they reared four broods before they came to an end, and I understood that, as in my own broods, no males made their appearance.

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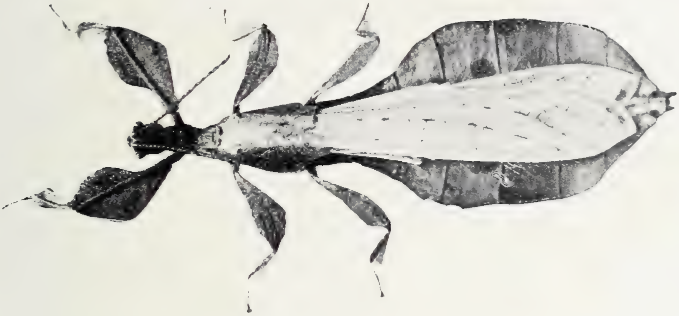
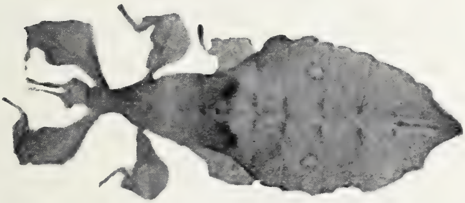
* 'Entomologist,' April and July, 1907, to the editor of which paper I am indebted for the loan of three of the six illustrations which accompany these notes (plates xxv. and xxvi.).

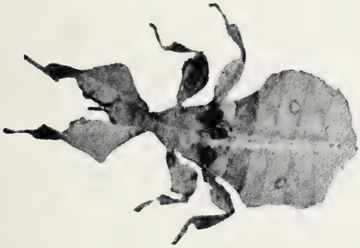
In May 1906, through the kindness of a friend who visited the Seychelle Islands in Lord Crawford's magnificent yacht 'Valhalla,' I became possessor of about thirty ova of the Leaf Insect referred to at the beginning of this paper, which duly began to hatch at the end of August. The wild guava is the natural food of this insect in the Seychelles ; but mine feed well on beech leaves, and later I get them on to oak foliage, with the intention of inducing them to take to the evergreen oak (*Q. Ilex*) for the winter, which answers well. A temperature of 70-80 Fahr. suited the larvæ well, and a saturated atmosphere, in addition to which the foliage of the food-plant is gently sprayed with tepid water once or twice a day, according to the season. Under those conditions I have had no losses, except by accidents. From the ova which were laid in April and given to me in May, the young larvæ began to hatch in the last week of August, and most of them emerged in September and October. But one did not leave the eggshell till January 8th, 1907. This insect, a female, survived till the 8th December of the same year. All the males were dead long before this female reached the imago state, but I have kept her ova to see whether, by parthenogenesis, she was able to perpetuate her species. However, up to the present time, 24th May, there have been no results. In the imago state the female feeds freely, and enjoys a fairly prolonged life, while maturing her eggs. But the male imago, though feeding as a rule is short-lived, sometimes dying directly after pairing. However, in one case, a particular male was noticed to mate with no fewer than five females, and this one lived several weeks. The insects are thirsty creatures, and although kept in a saturated atmosphere, welcome the spraying, and as soon as all is quiet can be seen sipping



Imago ♂



Nymph ♂



Larva ♂

Leaf-Insects.

BRITISH MUSEUM NATURAL HISTORY

the drops hanging from twigs and foliage. I am satisfied that moisture is as essential as heat to their well-being, as might be expected when the rainfall of their habitat is considered.

One result of breeding this insect under close observation is that the curious way in which the female deposits her ova was displayed. The ovum, after extrusion, is retained for some moments between the two processes at the end of the abdomen, which may be noticed in the photograph of the adult female, while she bends her body back as far as possible, and suddenly straightens it, releasing the egg at the same time, which is jerked to some distance. In my first brood, some of the females on a bush not enclosed in a cage flung their ova about the small stove-house, and several of the latter were found on a stage across the gangway that runs down the middle of the house, at least four feet away horizontally from the Ilex bush: and more than once, when we have been attending to these insects, we have been struck by an egg which was being expelled. The purpose probably is to secure the better distribution of the offspring. The ovum is curiously like the seed capsule of some plants, those of the mallow family for example, and as it lies on the moss and decaying vegetation of the tropical forest, it doubtless escapes the notice of some of its enemies owing to this resemblance. The young larva in the act of hatching pushes out a kind of stopper, which projects like the broken stalk of the simulated seed-capsule, and climbs about its cage, showing much more agility than at any later stage of its life. If alarmed, the young larva moves off with a curious swinging action of its body (as does the young mantis, and the young stick insect (*Bacillus*) its near relatives). This may perhaps be intended as a menace. At this early age the larva of *P. crurifolium* is yellow, mottled and splashed with pink. After a day or two it settles down on a leaf, and assumes a pale green colour. As this does not seem to be the case, so far as I can see, until it commences to feed, it is probably directly due to the chlorophyl absorbed.

At about the third stage the sexes begin to be distinguishable, the flat processes on the forelimbs of the male being less extensive than in the female larva, while the breadth of the abdominal segments is less, and the antennæ at successive stages become more and more prolonged, until, in the adult male, they measure about 28 mm., those of the female adult being no more than 3 mm. in length.

The adults differ greatly in colour, especially the females. Of course green largely predominates in most specimens, but some of the green ones of both sexes are beautifully decorated with reddish or orange brown, especially on the limbs. Others of the females are so marked with blotches and stains as almost exactly to resemble a decaying leaf.

I have bred some entirely yellow, and several of a crushed-strawberry colour, while a few are of an amber brown. These exceptionally tinted examples are all females. In spite of this protective colouring, I understand that since one of the Mynahs has been introduced into the Seychelles group, this Leaf Insect is much less common than it used to be.

The female is a sluggish creature, and as her ova mature she becomes more and more unwieldy. The male can, and does use his gauzy wings freely, especially after dark; and I am always careful about approaching the cage with a light, as the males are apt to injure themselves by dashing against the wire gauze or glass. The utmost that the female can do is to ease the severity of a fall by spreading her elytra, if she misses her hold of the food plant—an accident which I think seldom occurs in nature as the grip of the claws is very tenacious.

The examples which I reared during the autumn and winter of 1906-1907 were, I believe, the first bred in this country. The ova laid by these I distributed amongst several members of the Entomological Society, at least one of whom I am glad to say succeeded in rearing the insects to the imago state.

The photographs, for which I am indebted to my friend Mr. Digby Legard, explain themselves. I will only add that the portraits of the male Imago, and of the Nymph and Imago of the female were taken from the living insects, but the Leaf Insect, in its earlier stages, is so restless and fidgetty that we found it impossible to photograph them from life. Therefore, the portraits of the two earlier stages of the male, and the larva of the female are taken from freshly-killed specimens. The insects are all represented life-size. The abdomen of the male larva being turned back in the natural way is foreshortened in the picture, and scarcely conveys the idea of its narrowness, as compared with the body of the female at a similar stage.

I am preparing a series of this insect, in which both sexes, at successive stages, will be represented, for the National Collection at South Kensington.

In Memoriam.

PHILIP LOTEN.

(1845-1908).

It will be a sorrow and a surprise to many to learn of the death, on April 29th, of Philip Loten, of Easington in Holderness. Future visitors to Spurn will be debarred from having the pleasant chat with the remarkable owner of the quaint little museum, which was the show-place of the neighbourhood.

Photo by] [*Oxley Grabham.*
Philip Loten.

'Philip,' as he was generally known, had lived all his life in the vicinity of Spurn Point, where the flotsam and jetsam provided many treasures, and where he had early acquired his father's taste for natural history. There is no wonder that in such a glorious district he was able to study Nature to his heart's content. The myriads of avian visitors to the long, flat sandbank 'twixt the Humber and the sea were familiar to him from his boyhood. He knew their haunts, studied their habits; and this knowledge, together with his gift as an artist, and his ability as a workman, enabled him to prepare specimens in their natural attitudes. These were of a very different character from the 'stuffed' specimens with which one usually meets. The birds and flowers, and, in fact, all manner of natural history specimens were as familiar to him as are the silver and copper coins to an average townsman. His skill as a taxidermist was widely known, and many important museums and private collections are enriched by his handiwork.

In recent years, however, Philip had developed a liking for preparing artificial flowers, made from all manner of materials—fish bones and eyes, onion skins, postage stamps, and even finger and toe nails being requisitioned. These were carefully cut, and arranged in delicate sprays, which were mounted under glass on dark velvet. The result was very effective, and doubtless the fascination this occupation had, together with the expressions of surprise and admiration from visitors (particularly the ladies!) resulted in Philip eventually almost entirely neglecting the birds.

For years Loten's Museum at Easington has been a calling place for the scores of people who daily visit the Spurn district in the summer months. His specimens of the rarer birds were a source of attraction to the naturalist; his cases arranged to illustrate 'Who killed Cock Robin' and other stories of our younger days were a delight to the children; his sprays of flowers particularly appealed to the ladies; whilst all and sundry admired his beautiful garden—a miniature paradise of bloom of various kinds.

Some months ago, contrary to the advice of some of his friends, Philip decided to bring his collection to Hull for exhibition. Rooms were secured in a central part of the city, and, like Thomas Edward, of Banff, he packed up his specimens and removed them from their village home to the neighbouring seaport. As Edward learned to his sorrow at Aberdeen, so did Philip at Hull discover that the majority of the townsfolk cared little for his 'show.' The comparatively poor patronage which he received must have been a bitter disappointment to him. His visitors were few, and the change from the peaceful village to a busy town life seems to have acted upon his nerves, and whilst he was by no means in need of money, the disappointment he experienced, together with the changed conditions of living, eventually resulted in his being confined in an asylum, where he seemed to get worse, and eventually died.

Philip Loten might well be called the 'Thomas Edward' of Spurn, and one with the ability of Samuel Smiles might readily write a similarly interesting work to that author's charming 'Life of a Scotch Naturalist,' dealing with Philip. Both Edward and Loten were born naturalists; both lived at the junction of large rivers with the North Sea; both loved every form of animal and plant life, and knew each natural object for miles around. Both secured and prepared their own specimens, made their own cases, and painted in the backgrounds themselves, and both received a grievous disappointment on transferring their collections to their neighbouring large towns. To read the pathetic account of Edward's experience at Aberdeen, in chapter ix. of Smile's 'Scotch Naturalist,' is to read, almost precisely, the story of Philip's fate at Hull.

Philip Loten was not a voluminous writer, though he contributed notes to this journal from time to time, dealing with the rare occurrences of birds, etc. in the Spurn area. He was also responsible for a large number of records in the recently-issued 'Birds of Yorkshire.' He had been a member of the Yorkshire Naturalists' Union since its foundation. He was never married, and has no relatives who share his tastes.

Naturalists visiting Spurn in future will find a vast difference between the conditions which once existed, and those which must be now that Philip has gone.

T. S.

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Lord Eversley presided over a recent meeting of the Commons and Footpaths Preservation Society. The action of the owner of the soil of Osmotherley Common, Yorkshire, in issuing writs against certain inhabitants who claimed rights of common over this extensive moor, was considered, and it was decided to afford any assistance in the Society's power to the commoners.

We have received a further batch of memoirs from our contributor, Mr. T. Petch, the Government Mycologist in Ceylon—evidence that he has benefitted from his recent visit to England. Amongst the items are 'Revisions of Ceylon Fungi'; a lengthy paper in the Annals of the Royal Botanic Gardens, Peradeniya; 'A Preliminary Note on *Sclerocystis coremioides*,' '*Hydnocystis Thwaitesii*'; *Sclerotium stipitatum*'; 'A note on *Ustilago Treubii*'; 'Diseases of Tobacco in Dunbara'; and 'A Stem Disease of the Coconut Palm.' There is also apparently a reprint of the last-named, in native characters, which resemble minature ammonites, trilobites and spiders.

In Memoriam.

Sir JOHN EVANS,

K.C.B., D.C.L., LL.D., Sc.D., F.R.S., F.S.A., F.G.S., F.C.S., F.Z.S.

One of the most painful duties that one can have surely is to deal with the personality and work of some intellectual giant, knowing full well that all it is possible to say must fall very far short of what the subject of the notice is worthy. This difficulty is increased ten-fold when, as in the present instance, the writer is deeply indebted in so many ways to the person he refers to.

Sir John Evans died on May 31st, less than a month before, I had received a letter from him in which he said : 'I am in my eighty-fifth year, having been born in 1823. I am very well in general health, but suffer from local troubles incidental to old age, and there seems much difficulty in getting rid of them.'

But evidently, he had more than 'old age' to trouble him, and an operation for appendicitis was soon afterwards necessary, but did not avail.

To say that it will be exceedingly difficult to fill the place left by Sir John Evans, is to fall far short of the mark. It will be *impossible* to do so. No man living has the knowledge that Sir John possessed ; none in the future can have it. He had kept pace with the discoveries in geology and archæology during the nearly three-quarters of a century in which those sciences have developed from primitive beginnings into the numerous and complex branches which now characterise them, and of several of these branches he was the master. At the age of nine he made a geological excursion to the well-known 'Wren's Nest,' and Wenlock Limestone quarries at Dudley. So long ago as 1860 he contributed a paper to 'Archæologia,' dealing with 'Flint Implements in the Drift,' and from then until the present year various publications have been enriched by the products of his pen. But even these, and his numerous Presidential addresses to various scientific societies, sink into insignificance in comparison with his three magnificent volumes dealing respectively with the Coins, Stone Implements, and Bronze Implements of the ancient Britons. The first of these was published in 1864 (supplement in 1890), the second in 1872 (second edition in 1897), and the third in 1881. Each is a truly wonderful production, and can safely be said to treat more thoroughly and more systematically than does any other work on the subject, in any language.

Geology had a great attraction for him, and in turn he had been the Hon. Secretary, President, and Foreign Secretary of the Geological Society. But it was in the domain of prehistoric antiquities that his chief interest rested, and he collected an unrivalled series of valuable relics of British, Roman, Saxon, and later periods. Less than two years ago he attended the York meeting of the British Association, and took an active part in the work of section H. He was greatly interested in a find of some British coins, which was reported at the meeting, and made a special journey to Hull to examine the specimens in the museum there.

His worth was recognised by all the important societies at home and abroad. He has occupied the presidential chairs of the Numismatic Society, the Society of Antiquaries, the Geological Society, the British Association (also of the Ethnological, Geological and Anthropological sections of the Association), and the Anthropological Institute. He was also Vice-President of the Royal Society, and in 1884 delivered the anniversary address in the absence of Professor Huxley. Since 1885 he was a Trustee of the British Museum. He was also an honorary member of various societies in France, Belgium, Italy, and other European countries, and was similarly appreciated by important societies in America. In addition to the various offices he held in the scientific world, he took an active part in civil affairs, and was successively Deputy Lieutenant, Sheriff, and Chairman of the County Council for Hertfordshire, and also held several other offices in the shire. He took an active part in business, becoming a partner in the well-known firm of paper makers at Hemel Hampstead so long ago as 1851.

In an appreciative notice of Sir John Evans, in one of the 'Eminent Living Geologists' Series, so recently as January last, the writer says :—

'Most valuable among Sir John's many services to science has been his endeavour to tide over the gap between the Prehistoric and Historic periods of mankind, and to emphasize the importance of the Quaternary period in geology. He has also established for us a correct chronological succession of periods of time represented by the various discoveries of the implements and objects made by prehistoric man, which clearly indicate that gradual progress from the most barbaric savage, whose weapons of stone were rudely chipped and neither ground nor polished; until, as he advanced in intelligence and skill, we meet with a class of implements which, after being fashioned by chipping, have been ground or polished at their edges only, and again still further with those which are more or less ground or polished, not only at the edge, but over the entire surface.'

A list of his papers, and also of the various honours conferred upon and held by Sir John Evans, appear as an appendix to the notes in the 'Geological Magazine.'

Quite recently the scientific world has had to deplore the loss of far too many of its leaders, and to the list must now be added the name of Sir John Evans. We feel sure that every reader of this journal will join us in extending to Lady Evans and her family our sincere sympathy in a loss which must be even greater to them than to the scientific world.

T. S.

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The Annual Report of the **Public Museums and Meteorological Observatory of Bolton** for 1907, gives a resumé of the work accomplished, as well as a list of the additions. The Reports of the Hastings, Norwich, and Taunton Castle Museums are also to hand.

Plant Biology, by **F. Cavers, D.Sc., etc.,** pp. ix and 460. Clive, 3/6. Dr. Cavers is well known to our readers by his excellent studies on liverworts; the book now under notice is 'prepared to satisfy the requirements of teachers who prefer modern methods of work.' The title is suggestive of the newer outlook in botany, and the work marks a great advance on the time, not far distant, when elementary text-books were little more than glossaries of morphological terms. The life work of a plant is now taking its proper place, and at the same time morphology, histology and physiology are endowed with a new interest. All the organs, root, leaf, stem, flower, fruit and seed are considered from the point of view of function, the work they do is emphasised rather than the forms they take. Other chapters deal with nutritition, growth and irritability, ecology and biology of plants, as well as the biology of the soil, and four useful appendices deal with Greek and Latin roots, botanical terms, natural orders, and hints on practical work.

The author has tried to avoid writing a cram book, and students in want of a short-cut will find it useless, but to those who wish to know the elements of botany, and will conscientiously work through the numerous (we had almost said too numerous) experiments and observations outlined, will find here an excellently-planned course. Teachers too will find it especially helpful, and by its means be provided with abundant illustrations of the right kind. One or two slips occur which require modification, *e.g.*, on page 235 the statement—'it follows that the stamens and pistil are not the "female" organs' is clearly not what the author intends to say. The index is altogether too meagre to be of much use, and some errors occur in the reference numbers, *e.g.*, 'buds 90,' there being no mention of buds on that page. Such points as these, as well as a few apparently hastily-written passages, require emendation, but on the whole the book is a most welcome addition to our elementary text-books on botany.

THE ICE-BORNE BOULDERS OF YORKSHIRE.

J. H. HOWARTH, J.P., F.G.S.

(*Continued from page 224*).

SHAP GRANITE.*

Atwick.—*Crofts* (Y.B.C. & B.A.R., 1896).

3′ 2″×2′ 8″×2′ 4″ At foot of cliffs, noted by Mr. William Morfitt.—*Sheppard*, Y.B.C., 1898.

18″×20″×14″. At foot of cliffs.—*Stather*, Y.B.C., 1899-1900.

Balby, near Doncaster. Beastall's Sandpit.—*Corbett & Kendall*, Y.B.C., B.A.R., 1896.

Baldersby, N.R. 28″×23″×22″, rounded S.L. 100 on Keuper Sandstone. —*Gregson*, Y.B.C.

Barnard Castle. On the bank of Deepdale Beck, a small stream running into the Tees from the Yorkshire side, a little above B. Castle, 1 mile above junction with Tees on north bank. Rest on flat rock at edge of stream. 8′ 0″ high, 22′ 0″ circumference, axis N.E. and S.W. Known as the 'Stranger's Stone,' see 1st report, p. 21, Y.B.C. 550 O.D. On Mountain Limestone. Other smaller blocks in river bed.—*Manson*, Y.B.C., 1st year.

Barton, N.R. 1′ 8″×1′ 6″×2′ 0″. 250 O.D. Rounded Keuper Sandstone —*Gregson*, Y.B.C.

Barton-on-Humber (Lincolnshire), Mr. Milsom's Mill.—*Sheppard*, Lincoln B.C., B.A.R., 1896.

Bilbrough. Y. Geol. P. Society, Vol. XII., Pl. 4, p. 311. 1 Shap Granite afterwards in Y.B.C. and B.A.R., 1896.—*Kendall.*

Bishop Auckland Park. Beside a small tributary of the river Gaunless, now removed to the garden of Mr. R. Nelson, J.P.—*Manson*, B.A.R., 1897.

Bowes, N. Riding. Several about village.—*Sheppard.*

Bridlington. In Applegarden Lane, 100 yards S.E. of Priory Church. 2′ 8″×2′ 3″×1′ 5″ G. b. a. 1′ 3″×1′×7″. Collected from adjacent fields. S.L. 100. N.S. or G.—*Chadwick* 3rd Report Yorks.

South of Flamborough. The only one I have seen on the shore is a small one, rather more than a mile south of Bridlington Quay, but I do not doubt that they occur further south, because one is built into a wall at Hornsea.—*Dakyns*, B.A.R., 1879.

Burniston, near Scarborough. N.E. side of B. and Scalby Road, about one-third way between two villages. 3′ 6″×2′ 10″×2′ 0″. Above ground, rounded, moved from field adjoining, N.S. or G. On boulder clay.—*Chadwick* 3rd year Y.B.C.

South of lane descending from Burniston Fields. 4′ 0″×3′ 0″×3′ 6″; 4′ 0″×3′ 0″×3′ 0″; 4′ 6″×3′ 0″×2′ 0″.

North of Lane. 1′ 6″×1′ 3″×8″; 4′ 0″×3′ 0″×3′ 0″; 4′ 0″×3′ 0″×2′ 6″ 2′ 6″×2′ 0″×1′ 6″; 3′ 0″×2′ 6″×2′ 6″.—*Stather*, Y.B.C., 1898.

Burstwick, Holderness. In Gravel pit. 8″×6″.—*Sheppard*, Y.B.C., 1899-1900.

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* Records outside Yorkshire are included in order to show the remarkable dispersion of Shap Granite.

Letters Y.B.C. mean—Yorkshire Boulder Committee.
,, B.A.R. mean—British Association Reports.
,, N.S. mean—no striæ.
,, G. means—grooving.
,, S. L. mean—surface level.

Cayton Bay, near Scarborough. On beach under Red Cliff, 300 yards N. of fault. 4′×2½′×2½′.—*Stather*, Y.B.C., 1898-1899.

Claro Hill, near Knaresboro'. Now removed to entrance to Workhouse at Marton-cum-Grafton.—*Farrah*, Y.B.C., 1897.

Cliff House to Out·Newton, between Bridlington and Spurn Point. On Beach.—*Stather*. Y.B.C., B.A.R., 1896.

Commondale, near Skelderskew Farm House. 560 O.D.—*Kendall & Muff*, Y.B.C., 1899.

Cotherstone, 3 miles N.W. of Barnard Castle, about 600 O.D. 22″×20″ ×12″ sub. ang. striated, longer axis parallel with River Tees, ½ mile off N. on Mills. Grit.—*Gregson*, Y.B.C., 1897.

Cromer Point. 6 or 7 at least; also on the N. side of the point (that is as at Long Nab).—*Dakyns*, B.A.R., 1879.

Cundall, near Borobridge, N. Riding. Leckby Estate, 5 in Borobridge, ¼ mile above 'Elmire Ings' In bed of Swale close to Leckby Bank. 4′ 3″×3′ 0″×2′ 9″. More or less rounded. 50 O.D. There is a long ridge of Gravel and sand about ¼ mile away.—*Mitchell*, 2nd year Y.B.C.

Cusworth, near Doncaster. 5″×3″×1′ 5″.—*Corbett*, Y.B.C., 1897.

Darham. It is generally supposed to have been brought from the Tees for use in a cheese press. Another boulder on the same farm is known to have been brought from Tower Hill, near Barnard Castle.—*Manson*, B.A.R., 1897.

Darlington. West side of Northgate. 3′ high, 13.5 circumference. Known as 'Bulmer's Stone,' M.S. Has been moved. All portions visible removed S.L. 157 on red clay.—*Manson*, 1st year Y.B.C.

Dawpool, near Parkgate. Wastdale scree rock in association with Ennerdale Syenite, Dudden Felspathic Breccia, etc. B.A.R., 1877.

Deepdale Beck. On the bank of about a mile up the stream from where it flows into the Tees axis N.E. and S.W. Not embedded, but stands an a flat edge of the mountain limestone which forms the bed of the stream, 550 above sea level. Probably moved by man from the higher ground above the river since on the South End face are two holes filled with lead, as if for the insertion of iron hinge hooks for a gate which in its present position would hang over the river. (Called 'Stranger's Stone.')—*Manson*, B.A.R., 1887.

Dimlington and Easington. One pebble and three fairly large boulders all well rounded. Y.N.U. excursion, see Easington.—*Sheppard*, 1898 Y.B.C.

Dingle, near Liverpool (Lancs.).—*Stather*, B.A.R., 1896.

Doncaster. In a ploughed field near. 1897 Report to Y.N.U. See Balby, also Cusworth.—*Corbett.*

Dufton (Westmorland). Prof. Harkness reports that some fragments of Shap Fell (Wastdale Crag) granite occur in a field on the farm at Hindrig, near Dufton. 800 S.L. B.A.R., 1873.

Easington. Three Shap Granites on beach. Kilnsea Meeting, Y.N.U. *Stather*, Y.B.C., 1898.

Obtained from a heap of boulders that had been carried from the beach, and are now in Dr. Hewitson's garden. 12″×10″×8″ rounded. —*Sheppard*, Y.B.C., 1898.

Beach. 8″×8″×6″.—*Sheppard*, Y.B.C., 1902.

Easington Beck. See Saltburn.

Elmire. 6 m S. of Thirsk. Diam. 2′; sub-angular, no striæ. On Keuper Sandstone, overlaid by gravel. S.L. 60′.—*Gregson* (1st year Y.B.C.

Etherley. Flashes Farm. One Shap Granite.—*Nelson.*

Filey. On beach, behind wood in piles at base of cliff, near Ravine Villas. 3′ 3″×2′ 2″×2′ 2″. Rounded N.S. or G. On boulder clay.—*Gill*, 2nd year Y.B.C.

One large one on top of cliff about a mile from Filey. 3′×2½′×2′ —*Dakyns*, B.A.R., 1879.

Flamborough Head. There are several on shore between Flamborough Head, and Flamborough S. Landing, one measures 36 cubic feet. B.A.R., 1879.—*Dakyns.*

Foston-le-Clay. On Mr. Barker's farm in the village. 2′ 4″ × 2′ 6″ × 2′ 0″. Out of ground, rounded, N.S. or G. S.L. 150 on a long ridge of boulder clay running nearly N. and S. A footpath runs through the village constructed of boulders at least 3,000 from 1′ 6″ to 6″ diameter, principally rounded, few ang. and sub. ang. ¾ths Sandstones, remainder mountain and Liassic Limestone, a few Whinstone and *Shap Granite* also Red and Grey Granite. This path was constructed by Rev. Sydney Smith, who had the boulders gathered from land.—*Chadwick*, 3rd year Y.B.C.

Gainsborough. Lincolnshire. One large block of S. G. on Spital Hill—the light variety.—*Jordan*, Y.B.C., 1899-1900.

Ganton. Boulder, $\frac{2' \ 11'' \times 2' \ 6''}{2' \ 1''}$ forming corner stone on the premises belonging to Greyhound Inn. 60′ above sea level.—*Chadwick*, Y.B.C., 4th year.

Grayrigg, Westmorland. See Kendal.

Grosmont, near Whitby. Estate of Messrs. Bagnall, Iron Works. 2′ 3″ × 1′ 10″ × 2′ 0″ well rounded, moved, N.S. or G. S.L. 100′. Originally in bed of river Esk, which is 300 yards E. of Railway Station, Boulder found 50 yards N. of 1st Railway Bridge crossing stream. On Alum shales of the lias.—*Chadwick*, 2nd year, No. 3 Y.B.C.

See postcard of Dr. Tempest Anderson as to boulder in Grosmont Church Yard, removed by T. A. from High Borough (Roman Camp). P/c to Boulder Com. 31/1/97. —*Reported in* Y.B.C., 1897.

Guisbro. In Abbey Gardens. Two Shap Granite.—*Davis and Stather* Y.B.C., B.A.R., 1896.

Helm End. (Inns). See Kendal.

Helm Westmorland. See Kendal.

Hest Bank, Morcambe, Lancs. In boulder clay, exposed in cliffs. Reported by Thos. Ransome, determined by P. F. Kendall, B.A.R., 1891. Of the group of boulders formed here the B.A. Report, 1891, says: 'The stones are exclusively such as might have been derived from the country at present draining into the internal angle of Morcambe Bay. Account must be taken of this fact in any attempt to explain their origin.'

High Catton. Gravel pit in supposed Moraine.—*Corbett & Kendall.*

Hindale Point. See Long Nab.—*Gill*, 2nd year, Y.B.C.

Holtby. In railway cutting through ridge of B. Clay. Three Shap Granite.—*Corbett & Kendall*, Y.B.C., B.A.R., 1896.

Hornsea. One built into a wall.—*Dakyns*, B.A.R., 1879.

A pebble found in the purple boulder clay cliffs about 200 yards north of new parade. 18″ × 12″ × 3″.—*Sheppard*, Y.B.C., 1898; *Walton*, Y.B.C., 1902.

Hunmanby. Three Shap Granite. 'Grey' on the farm known as 'Airy Hill,' collected from adjacent fields. Largest 2′ 3″ × 2′ 2″ × 11″, rounded to sub. aug. surface of country boulder clay.—*Chadwick*, 2nd year, No. 10.

End of road leading to beach. 3′ 7″ × 2′ 3″. Sb. a. N.S. or G. On Boulder Clay.

Iburndale. 250 yards north of Throstle Nest, North East Yorks. 80 O.D. —*Kendall & Muff*, Y.B.C., 1898-1899.

South of valley. 1 S.G. Between Sleights and Littlebeck.—*Kendall.*

Ingleton. Church Street, near County Court, in main drainage. 125′ S.L. Shap (?). 16″ × 7″ × 5″ oval. Very much worn.—*Tate*, B.A.R., 1892.

Irby. Lincolnshire. In Rectory Garden. Found built into a Saxon 10th Century Wall.—*Tuckwell*, L.B.C., B.A.R., 1896.

Isle of Man. Kirk Bride Shore. One Shap Granite Sub. Ang. striated.—*Harrison*, B.A.R., 1897.

Kendal, Westmorland. Several in Spital Wood; one near Kendal Reservoir; one or two on Castle Hill, Kendal; one near Windy Hill; one on the East side of Helm; some boulders of granite and of the altered rock surrounding the granitic area near the footpath by Murley Moss to Oxenholme; one in a drift bank cut through by the canal near Larkrigg; several in the fields east of Stainton; others near the footpath from Stainton to Sedgwick, one on the top of a drift hill half a mile due west of Sellet Hall—several near Hindcastle; some in front of a farm house at Wath Sutton. I have also found Granite boulders on the roadside between Natland and Helm, at the inns near Helm End, and in a field a quarter of a mile west of Storth End; and on the road half a mile N.E. by N. of Storth End; and at the bend of road E. of Milnthorpe Station, besides in many other places which it would be tedious to mention.

I have traced these boulders as far S. as Milnthorpe. They occupy a narrow belt of country whose long axis points directly for the granite of Shap Fells. I have not seen any west of river Kent. The most westerly I have seen are some near Hincaster still lying undisturbed in a lane. A line drawn from Sleddale Pike, the most westerly outcrop of granite on Shap Fells, to these boulders bears S. by W. The most easterly in this neighbourhood is a large one near Windy Hill, about two miles S.E. of Kendal Railway Station, but I once saw one high up on the side of Grayrigg Fell, N. of Grayrigg Tarn, which lies a good deal further east.

Boulders of the ordinary volcanic rocks of the Lake Mountains indicate other directions for the ice flow, thus a large one of volcanic breccia from the Lake Mountains may be seen lying on the side of Sedbergh Road, about 2½ miles out of Kendal, and east of the line of Granite boulders.

As the granitic area of Shap Fells is at the extreme east end of the volcanic rocks, this boulder must have crossed the line of flow along which the granite boulders travelled.—*Dakyns*, B.A.R., 1878.

Kilburn. Roadside. Heap in the village.—*Kendall*, Y.B.C., 1902.

Kilnsea, E.R. On beach, 500 yards S. of Kilnsea Beacon. 3′ 2″ × 2′ 4″ N.W. and S.E. striae long axis on blue clay. (November, '89, first found so far S. on Yorkshire coast, near Spurn Point).—*Cordeaux* to Y.B.C.

Kirk-Bride, Isle of Man. See Isle of Man.

Laithkirk, near Middleton N.R. On North bank of Lune. 2′ 8″ × 1′ 9″ × 2′ 6″. No striæ. Original site 700′ above sea level. 5th year to Y.B.C. 7th Report Laithkirk. 8th Boulders S.L. 6/1200′.—*Bell.*

1. By highway, no striæ. 1200′.
2. Brookscar bed of Lune. 800′ cubical block, 2 or 3 tons. No striæ.
3. In Lune, below Church. 3′ 6″ × 1′ 7″ × 2′ 6″. (Removed to Yorkshire College, Leeds).
4. In Vicarage Garden.
5. Broken up fragments existing.
   Formerly near No. 3, S.L., 700′.
6. In Hind's field, near Limebridge. N.S., now in park. S.L. 600′ Middleton in Teesdale.
   (Nearly two tons on weighing machine).
7. Six larger—blasted by farmer. Fragments still are to be seen S.L., 600′.
8. Similar to No. 2. Blasted fragments used as copings of the Rose and Crown garden wall. A few small Shap Granites may be seen in private grounds.

'It is a curious fact that all Shap Granite boulders found in this district occur only in the valley of the Lune. In the adjoining Valley of the Tees none are to be seen, &c., &c.'—*Bell* to Y.B.C.

Larkrigg, Westmorland. See Kendall.

Long Nabb, several (four at least) on the N. side of the Nab. One measures 8 cubit feet.—*Dakyns*, B.A.R., 1879.

Low Coniscliffe, in bed of Tees. See Manson 1st year, p. 23, Y.B.C.

Luhan, Parish of Edenhall, Westmorland. Several blocks on a farm at about three miles E. of Dutton (Hindrig). B.A.R., 1876.

Luddington. 4½′×3′×2½′; 2½′×2′×2′; 6′×5′×5′. Immediately N. of Long Nab; half way between Long Nab and Hundale point.—*Stather*, Y.B.C., 1898.

'Serving as a guard to the corner of the gateway of Smith's farm.'—*Cooke*, Lincolnshire.

Marton-cum-Grafton. 3 miles S.E. by S. from Borobridge. 3′ 3″×3′ 1″ ×2′ 6″. Greatest girth, 9′ 9″

2′ 5½″×2′ 6″×1′ 8″. Greatest girth, 8′. Rounded N.S. or G. Moved from narrow lane leading to Scruddle Dyke Pond to Vicarage Gardens. Former position S.L., 100′. There are long ridges or gravel in the Parish.

NOTE.—Shap Falls are 64 m. N.W. of Marton. See Claro Hill.—*Knubley*, 3rd Report, Y.B.C.

Milnthorpe, Westmorland. See Kendal.

Morcambe. On shore near Battery Inn, West End.—*Speight*, Y.B.C., 1898-1899.

Mount Grace Priory. 7 miles N.E. of Northallerton. 24″×12″×10″ sub. ang. No striæ.—*Gregson*, Y.B.C., 1898.

Mulgrave Park, near Whitby. 4 miles N.W. of Whitby, on N. side of stream running east between the old castle of Mulgrave, and a spot known as the Hermitage. 3′ in dia. No striæ. S.L., 100′. Isolated in rivulet probably rolled down from clay above. Stream cut through Lias Shale.—*Manson*, Y.B.C.

Murley Moss, Westmorland. See Kendal.

Natland, Westmorland. See Kendal.

North Sea. 20 to 40 miles off coast. North of Flamborough Head. Large number of boulders are found strewing the bottom of the North Sea, but they are arranged very much in a belt, which is approximately parallel to the existing coast at a distance of 20 to 40 miles from the land. The outer or eastern edge of this belt is not well defined, but on the western side it would appear to have a sharper boundary, as the marks used by trawlers to avoid the boulders shew that the line is well marked.

While preserving a line parallel to the existing coast, it is curious to note that just opposite to the mouth of the Tees the inner edge of the 'rough ground' by which name this belt is known to the fishermen, makes a sharp bend to the eastward, coinciding almost exactly with a line drawn down the Tees Valley. I venture to suggest that this large belt of erratic blocks is connected with the history of the giant glacier which descended the Tees Valley, bringing among other stones masses of the well-known Shap Granite. The boulders I have seen brought on shore, having been trawled up by the smacks, are either of Shap Granite or Carb. Limestone, and of those I have examined some sixty to seventy specimens, the rough ground, as far as I am aware, extends from the coast of Northumberland to the mouth of the Humber. While the boulder clay on the coast line contains blocks of Carb. Limestone and Shap Granite, the glacial deposits in the Valleys of the Rye and Derwent, south of the Cleveland Moor District, are composed of Oolitic and Liassic detritus, and are very different from those on the coast, though only a few miles distant from each other.—*Woodall*, B.A.R., 1882.

Out Newton, Holderness Coast. (See Cliff House). 3′×2′×1′.—*Stather*, Y.B.C., 1902.

Peak, Yorkshire Coast. 600′ O.D. 1, S.G. 18″×15″×12″. In thick glacial gravel, quarry above the railway station.—*Stather*, Y.B.C., Y.B.C., 1899-1900.

Piercebridge, near Lowfield, ¾ mile west Cliffe Hall on the Yorkshire side of Tees. 10′ long front face ; 7′ 4″ front to back, sunk in ground. 4′ visable ; sb. a., rounded top. Axis N.S. S.L. 250′ river level. Another small boulder lies one mile W., on the left of the walk leading to Cliffe Hall, rounded. 3′ long, axis E. and W., probably moved by those who made the path near which it lies.—*Manson*, 1st year, Y.B.C.

Port Lewaigue, Isle of Man. See Isle of Man.

Rekhill, near Thirsk.—*Hall.*

Robin Hood's Bay. From Bay Town to South Check on beach.
36×23×19″ ; 26×26×16″. Almost buried in sand.
60×31×27″. Saddle shaped.
62×56×34″. Pyramidal shaped.—*Hawkesworth*, 10th year Y.B.C.

The following boulders were found on beach, but have undoubtedly been washed out of the boulder clay which here caps the Lias Shale. 81 boulders varying in size from 42″ in diameter to a few inches. By far the greater proportion were found near the cliff, though a few were seen amongst the numerous boulders which are alone visible at low tides.'—*Sheppard & Muff*, 10th year, Y.B.C.

Mill Beck (3 b's.). Rest on lower Lias on Shore :—
1. 2′ high. Circum. 9′
2. 1 ,, ,, 7½′
3. 1′ ,, ,, 7½′—*Gregson* B.A.R., 1887.

Rokeby Park. On the banks of the Greta in its junction with the Tees. 36″×30″×16″. No striæ ; axis N. W.& S.E. on Carb. Limestone S.L., 430′.—*Gregson*, Y.B.C.

Royston. No. 48 referred to in 8th year Y.N.U. as wanting Barnsley Corporation to take it. Facing Peckett's Farm House. Alt. 260 feet. 30″×30″×24″. Formerly used as a horse block. See 'Geol. Mem. of Yorks. Coal Field,' p. 776.S.L., 260′.—*Green.*

Runswick Bay. 3 S.G. One grey. They are on shore, rounded N.S., are about 4′ across each way on Middle Lias.—*Gregson*, 3rd Report, Y.B.C.
30″×24″ ; 66″×48″×36″. On the beach near village.
24″×24″×18″ ; 48″×46″ ; 36″×48″. This group, with probably many others, in the bed of the largest of the four or five becks which run into the bay.—*Stather*, Y.B.C., 1899-1900.

Saltburn. In bank of mill race to Marske Mill.
1. 51″×36″×30″. Rounded.
2. 24″×20″×18″. Sub. Ang.
3. 48″×30″×24″. ,,
—*Hawkesworth*, Y.B.C.

Saltburn. Opposite Zetland Hotel. S.L., 150.—*Veitch* 2nd Report, p. 346.

Saltburn. Gardens. 'Boulder for ornamental purposes, probably taken from Skelton Beck which runs close by.'
40×30×30″ ; 36×20×20″. Shingle Bed on beach S. of Saltburn.
17×10×7″. Easington Beck.
20×30×12″ about 1 mile up from Sea.
43×36×20″ ,, 2 miles ,, —*Hawkesworth*, Y.B.C. Report, 10th year.

Sandhutton, near Thirsk. $\frac{3' \times 1'\ 10''}{1'\ 10''}$ N.N.W. and S.S.E. S.L. 98′. Isolated on Keuper Sandstone. No striæ.—*Gregson*, Y.B.C.

Scarborough. In garden of King's Cliff Hospital. Collected by owner, John Wharton, from coast and highways in immediate neighbourhood. 52 Shap Fell from half a cwt. to two tons. See also 1st Report, p. 23. —*Phillips*, to Y.B.C., 1893 Report.

Scarborough. Mr. Read's Garden. Valley Road. 4′ high; 3′ wide; 12″ or 14″ thick. Found on beach embedded in sand when foreshore made six years ago (1880). Wharton collection (see above) largest 11′ circum., 4′ high N.S. on any. Apparently laid on sea beach a great length of time.—*Phillips*, 1st year Y.B.C.

Seamer. 5′ 8″×4′ 10″×4′ 3″. Seamer Station.—*Dakyns*, B.A.R., 1880.

Seamer. 2 miles S.E. of village, and close to Seamer junction, N.E.R., on estate of Lord Londesboro'.

Set No. 37.

No. 1.	Red Granite	1′ 0″×0′ 9″×0′ 6″
,, 2.	Shap ,,	2′ 6″×1′10″×1′ 4″
,, 3.		1′ 0″×1′ 0″×0′ 9″
,, 4.		1′ 6″×1′ 0″×0′ 9″
,, 5.		1′ 2″×1′ 0″×0′ 8″
,, 6.		1′ 8″×1′ 6″×0′ 9″

All rounded. Moved but from Seamer Gravel Drift N.S. or G. S.L. 200, Gravel drift overlies Coralline Oolite.—*Chadwick*, 2nd year Y.B.C.

Sedgwick, Sellet Hall, Westmorland. See under Kendal.

Sneaton. Alt. 400′. 1 S.G.—*Davis & Stather*, Y.B.C., B.A.R., 1896.

South Bank. In boring operations at South Bank 30′ to 120′ depth.—*Tate*. B.A.R., 1892.

Speeton, near Filey. Speeton Gap, 2′ 9″×2′ 0″×1′ 8″. S.L. 50′ 250 yards N.W. of beach, N.E. and S.W. Striæ and long axis. Jordan's Farm, on chalk. 12″×8″×8″.—*Stather*, Y.B.C., 1899-1900.

Spital Wood, Stainton, Westmorland. See under Kendal.

Staintondale Cliffs. About ¾ mile S.E. of Peak Hall, near Robin Hood's Bay, on the first ledge of the Cliffs. 3′ 5″×3′ 0″×2′ 0″. N.W. and S.E. No striæ. S.L. 250.

Stanghow Ridge, near Smithy. N.E. Yorks. 675 O.D. 1 Shap Granite. —*Kendall & Muff*, Y.B.C., 1898-1899.

Startforth, near Barnard Castle. Egglestone Abbey. S.L. 500′. 24″×15″×15″. On Carb. Limestone.

On right bank of Tees 50″×36″×30″ on Carb. Limestone.
48″×30″×27″ ,,
12″ diameter ,,
32″×28″×26″ ,,
30″×12″×10″ ,,

Staveley. 3 miles S.W. of Borobridge. 200′ S.L. in ridge of gravel on either side of the Church. 'I have found *one* piece of S.G. about a foot long.'—*Knubly*, 3rd Report Y.B.C.

Storth End. Wath Sutton, Westmorland. See under Kendal,

Tanfield. 3 miles from Masham on Stubbings Farm. 32″×28″×39″. Embedded about 24″, axis S.E. about parallel with River Ure. Striæ (top) S.E. and N.W. S.L. 300′. Resting on millstone grit.

Lindrick Farm. 2 miles W. of Ripon. 18″×13″×9″. No striæ. S.L. 300 Lower yellow Limestone (Permian). Removed to Museum, Ripon.—*Gregson*. See .

Tees Salt Works. Shap Granites. 'On Lake Country Rocks.' 1893 Report.—*Tate*.

Tees Side. In boring operations at North Ormesby and South Bank as well as north of the Tees Estuary.—*T. Tate*.

Thirsk. At least 30.—*Hall*.

Thornton-le-Beans. Parish of North Otterington, near Northallerton. Centre of village. 3′ 10″ E. and W. ×3′ 2″ N. and S.; above ground, 2′ 4″, probably as much under; rounded, moved uncertain, axis E. and W., N.S. or G. On clay.—*Parkinson*, 2nd year Y.B.C.

Ulverston. Lancashire. Paving stone in Town street, said to have come from Walney Island. 'Naturalist,' April 1897, p. 105.—*Petty,*

Upsall. Hag's Hill, near Thirsk.—*Hall.*

Walney Island. See Ulverston.

Washton. N.R., of York. Half-way between Richmond and Barnard Castle. 32″×25″×21″ sub. ang. No striæ. 700′ O.D., rough estimate.—*Gregson,* Y.B.C., 1897.

Wath, near Ripon. Y.B.C., 5th year.—*Mitchell,*

Wath Sutton, Westmorland. See Kendal.

Wear (River). Manson says (report 1st year, p. 23) :—'Have never observed it in the Wear, or rather that portion of it down to Bishop Auckland.'

Wheatcroft, near Scarborough. In corner of second field from road. 1. S.G. 2′ long.—*Kendall,* Y.B.C., 1899-1900.

Whitby. On West Cliff Sands. 4′×2′×2′ 3″ on shore. Sub. ang. N.S.—*Gregson,* 3rd Report, Y.B.C.

Withernsea. One Shap Granite small boulder on the beach ; one larger boulder in a garden near the 'Spread Eagle' Hotel. Has probably been collected from the beach.—*Sheppard.* Y.B.C., 1898.

York. From boulder clay dug out of Station foundations.

1. 2′ 9″×1′10″×11″. Irregular shape, smooth.
2. 1′ 4″×1′ 4″×10″. Irregular, parallelopiped, rough surface.
3. 3′ 1″×2′ 3″×1′ 10″. Irregular, rounded, but not smooth.
4. 2′ 9″×1′10″×1′ 7″. Irregular, oval, smooth. — *Platnauer,* 2nd year Y.B.C.

On the accompanying map (Plate XXII.) is marked the distribution of the erratic boulders scheduled herein. The localities where representative rocks of each group are recorded are indicated by initial letters, 'W' (Western), 'N' (Northern), 'E' (Eastern).

Shap Granite is separately shown by the letter 'S,' and certain distinctive rocks from Scotland, Norway and Sweden are also indicated by their respective initial letters.

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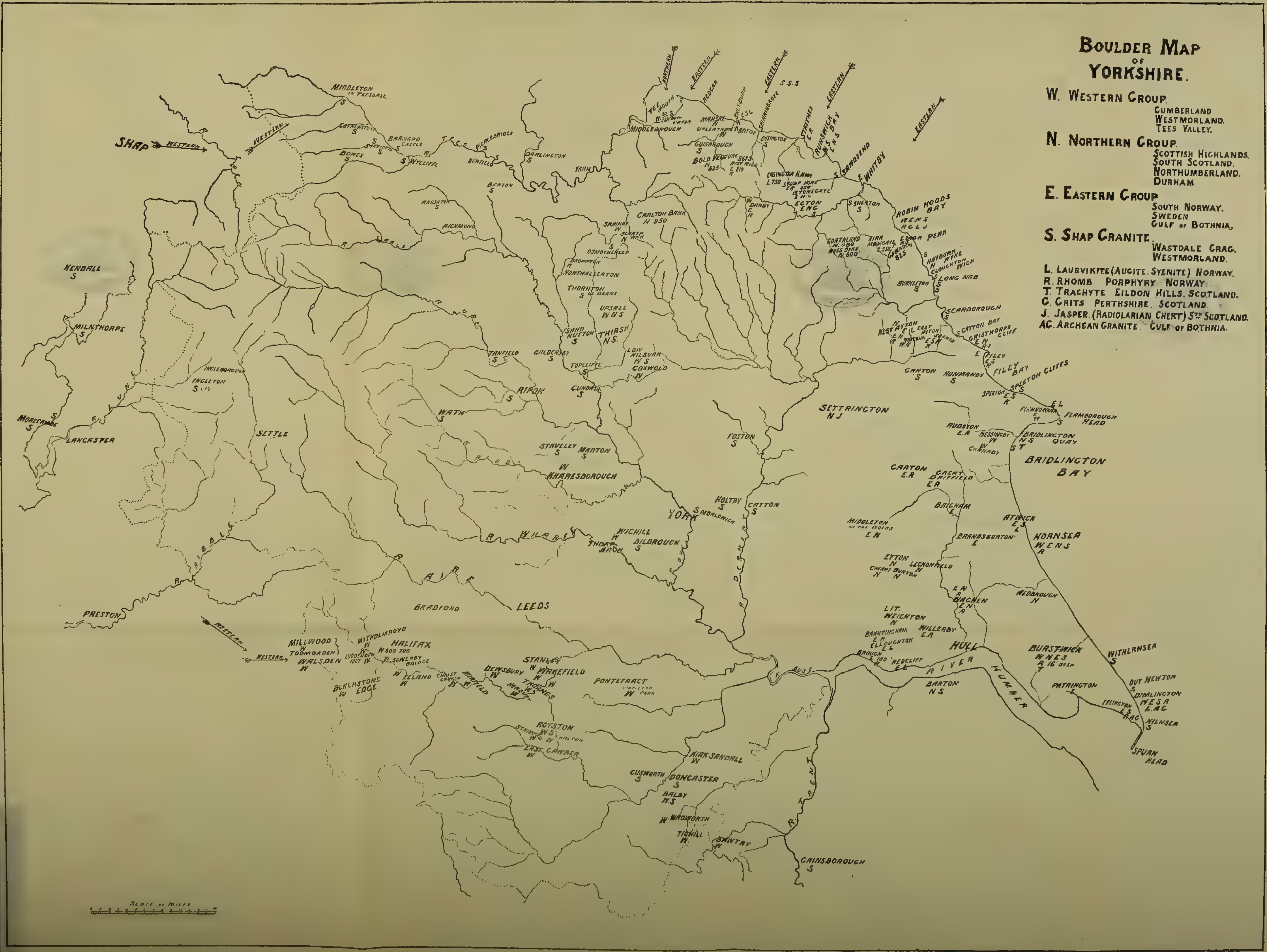
An article on 'The School Museum System at Sheffield,' by Mr. E. Howarth, appears in 'The Museums' Journal' for April.

The May 'Zoologist' is exceptionally interesting. Our contributor Mr. C. Oldham, has some interesting 'Field-notes on the birds of the Ravenglass Gullery.' Mr. W. Warde Fowler gives some Notes on Avignon, Mr. Gordon Dalgliesh writes on 'The Mammals of Surrey' (with illustrations of shrews and mice) ; Mr. T. C. Parker gives a second instalment of his 'Notes from Lakeland, Cumberland, and Westmorland, 1905,' respecting the first portion of which Messrs. D. L. Thorpe and L. E. Hope make some scathing remarks. There are also shorter notes.

We have received two interesting reprints from Mr. G. S. West, of the Birmingam University. Both papers appeared in the Linnean Society's Journal. The first is an exhaustive Repord on the Freshwater Algæ, including Phytoplankton, of the Third Tanganyika Expedition, 1904-5. Mr. West's memoir includes descriptions and illustrations of several forms, including one genus, thirty-six species, and eighteen varieties new to science. The second paper deals with some critical green algæ, and includes descriptions and illustrations, amongst others, of the following new species : *Polychætophora simplex, Kirchneriella subsolitaria,* and *Phyllobium sphagnicola.*


BOULDER MAP OF YORKSHIRE.
W. WESTERN GROUP. CUMBERLAND WESTMORLAND. TEES VALLEY.
N. NORTHERN GROUP. SCOTTISH HIGHLANDS. SOUTH SCOTLAND. NORTHUMBERLAND. DURHAM
E. EASTERN GROUP SOUTH NORWAY. SWEDEN GULF OF BOTHNIA,
S. SHAP GRANITE. WASTDALE CRAG. WESTMORLAND.
L. LAURVIKITE (AUGITE. SYENITE) NORWAY.
R. RHOMB PORPHYRY NORWAY.
T. TRACHYTE EILDON HILLS. SCOTLAND.
G. GRITS PERTHSHIRE. SCOTLAND.
J. JASPER. (RADIOLARIAN CHERT) STH SCOTLAND.
AC. ARCHEAN GRANITE. GULF OF BOTHNIA.
SHAP
WESTERN
NORTHERN
EASTERN
MIDDLETON IN TEESDALE
COTHERSTONE
BARNARD CASTLE
BOWES
WYCLIFFE
PIERCEBRIDGE
MANFIELD
DARLINGTON
YARM
MIDDLESBROUGH
REDCAR
MARSKE
SALTBURN
GUISBOROUGH
SKINNINGROVE
STAITHES
RUNSWICK BAY
SANDSEND
WHITBY
ROBIN HOODS BAY
PEAK
CLOUGHTON WICK
LONG NAB
BURNISTON
SCARBOROUGH
CAYTON BAY
GRISTHORPE CLIFF
FILEY BAY
SPEETON CLIFFS
FLAMBOROUGH HEAD
BRIDLINGTON QUAY
BRIDLINGTON BAY
KENDALL
MILNTHORPE
MORECAMBE
LANCASTER
INGLETON
SETTLE
PRESTON
CARLTON BANK N 950
NORTHALLERTON
THORNTON
UPSALL W N S
SAND HUTTON S
THIRSK N.S.
TANFIELD
RIPON
WATH
STAVELEY
MARTON
KNARESBOROUGH
SETTRINGTON N J
FOSTON
HOLTBY
CATTON
YORK
WICHILL
BILBROUGH
THORP ARCH
R. WHARFE
R. AIRE
R. RIBBLE
R. DERWENT
BRADFORD
LEEDS
HALIFAX
MILLWOOD
TODMORDEN
WALSDEN
BLACKSTONE EDGE
DEWSBURY
WAKEFIELD
PONTEFRACT
ROYSTON
KIRK SANDALL
CUSWORTH
DONCASTER
BALBY
TICKHILL
BAWTRY
GAINSBOROUGH
R. TRENT
HULL
RIVER HUMBER
OUSE
BARTON N S
HORNSEA W E N S
WITHERNSEA
PATRINGTON
OUT NEWTON
DIMLINGTON
KILNSEA
SPURN HEAD
BURSTWICK
ALDBROUGH
BRIGHAM
ATWICK
BRANDSBURTON
LECONFIELD
ETTON
MIDDLETON ON THE WOLDS
RUDSTON
CARNABY
GREAT DRIFFIELD
GARTON
HUNMANBY
GANTON
SCALE OF MILES

BRITISH MUSEUM
NATURAL HISTORY

NOTES ON CHESHIRE LAND AND FRESH-WATER MOLLUSCA.

CHAS. OLDHAM, F.Z.S.

THE following notes are intended to supplement a paper entitled 'The Land and Freshwater Mollusca of Cheshire,' which appeared in 'The Naturalist' for 1896 (pp. 109-128). During the past twelve years I have had few opportunities for collecting shells, but, as I am no longer living in Cheshire, it seems desirable to add to my previous record such notes on the less common species as I have. With these I have incorporated information published in 'The Naturalist,' the 'Journal of Conchology,' and Mr. J. W. Taylor's 'Monograph of the Land and Freshwater Mollusca of the British Isles,' and notes on specimens in the collections of Mr. B. R. Lucas, and the Rev. H. G. Barnacle, to both of whom I am indebted for information.

Of the twelve species mentioned in the following notes, which were not included in my list,* six are indigenous to Britain, but only three—*Acanthinula lamellata, Vallonia excentrica* and *Vertigo pusilla*—to Cheshire. *Testacella maugei, T. haliotidea* and *Vitrea draparnaldi* are, locally, only found in and about gardens, and are, obviously, introduced forms. *Milax sowerbyi* and *M. gagates,* although more firmly established than these three, have, in my opinion, no better claim to be considered as native in Cheshire. *Planorbis corneus, Vivipara contecta* and, probably, *Dreissensia polymorpha* and *Sphærium pallidum* belong to the same class. *Opeas goodalli* and *Subulina octona,* tropical forms, occur only under highly artificial conditions in hot-houses, but are mentioned as a matter of general interest. During the past ten years four alien species—*Planorbis dilatatus, Physa heterostropha, Paludestrina jenkinsi* and *P. taylori*—have been detected in the local canals. The first two are American species, but whence the last two reached this country is unknown. *Planorbis dilatatus* is hardly likely to become permanently established except in the vicinity of cotton-mills, where effluents of warm water provide the temperature necessary for it, but *Physa heterostropha* is bound by no such limitations, and *Paludestrina jenkinsi,* which has displayed in Cheshire as elsewhere in Britain an extraordinary capacity for colonization, is already widely diffused. *Paludestrina*

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* These are indicated by an asterisk.

taylori—a species of peculiar interest to local naturalists, seeing that it was made known to science from Cheshire examples—is well established in one canal, and may be expected to extend its range by colonizing other canals which are connected with it.

The symbol ' ! ' implies that I have seen the shells referred to.

The arrangement, and, in the main, the nomenclature adopted are those of the list published in 1904 by the Conchological Society of Great Britain and Ireland.

I have used the following abbreviations :—

B.R.L. — Mr. B. R. Lucas.
C.O. — Charles Oldham.
H.G.B. — The Rev. H. G. Barnacle.
' J. of C.' — ' The Journal of Conchology.'
' Mon.' — Mr. J. W. Taylor's ' Monograph of the Land and Freshwater Mollusca of the British Isles.'
' Nat.' — ' The Naturalist.'

GASTROPODA.

Fam. TESTACELLIDÆ.

**Testacella maugei* Fér. None of the species of *Testacellæ* is indigenous in Cheshire, although all three have been found in nursery-gardens, green-houses, and similar situations.—Clibran's ' Nursery-gardens,' Bowdon, April, 1897 (W. E. Collinge, ' Journal of Malacology,' December, 1897, p. 43).

**Testacella haliotidea* Drap. Arley Hall, near Northwich. (W. M. Webb, ' Journal of Malacology,' July, 1897, p. 25). Garden, Starkey House, Adlington, March, 1906 ! (C.O.).

Testacella scutulum Sowerby. Garden, New Ferry ! (A. Leicester, ' J. of C.', vol. xi, p. 25),

Fam. LIMACIDÆ.

Limax maximus L. v. *obscura* Moq. Sale, 1894 ! Alderley Edge, 1897 ! (C.O., *cf.* Taylor, ' Mon.', vol. ii., p. 46).

Limax maximus v. *tetrazona* Taylor. Sale, Feb., 1895 ! (C.O., *cf.* Taylor, ' Mon.', vol. ii., p. 43).

Limax cinereo-niger. Wolf. v. *luctuosa* Moq. The typical form of this species is unknown in Britain. I recorded it for Cheshire (' Nat.', 1896, p. 113), in ignorance of the precise characters which distinguish it from the var. *luctuosa.* I have taken the variety in many places in the Goyt Valley, between

Marple and Errwood Hall, as well as at Wincle in the Dane Valley! (C.O. 'Nat.', 1899, p. 340).

Limax flavus L. Holmes Chapel, November, 1896! Knutsford! An abnormal example with bifurcate tail, Alderley Edge, July, 1898! (C.O. 'Nat.', 1898, p. 240).

Limax flavus v. *tigrina* Pini. Liverpool Road, Chester, October, 1903 (Taylor, 'Mon.', vol. ii., p. 271).

Limax arborum Bouch. Great Budworth, August, 1896! Fernilee, August, 1896! Wincle, May, 1897! Disley, June, 1897! Gawsworth, November, 1897! Crowden, July, 1899! Cranage, 1901! (C.O.).

Limax arborum v. *bettonii* Sordelli. Alderley Edge, December, 1900! (C.O.).

Limax arborum v. *fulva* Norm. Marple, March, 1896! (C.O.)

Limax arborum v. *maculata* Roebuck. Goyt Valley, near Errwood Hall! (C.O., 'Nat.', 1896, p. 354).

Milax sowerbyi (Fér.) Neither this species nor *M. gagates* is found in Cheshire, except in gardens and their immediate vicinity. Neither appears to be indigenous.

Milax sowerbyi v. *pallidissima* Less. and Poll. Taken at Chester by Mr. R. Newstead, September, 1904. (Taylor, 'Mon.', vol. ii., p. 284).

Milax gagates (Drap.) v. *plumbea* Moq. Winnington, 1902! (B.R.L.). Marple, 1904! (F. Taylor). Beeston Castle, September, 1900! Alderley Edge, December, 1900! (C.O.).

Milax gagates v. *rava* Wlms. Winnington, 1902! (B.R.L.). Knutsford, January, 1901! Bowdon, November, 1901! (C.O.).

Fam. ZONITIDÆ.

**Vitrea lucida* (Drap.). Not indigenous. Greenhouse at Greenbank, Northwich, 1901! (B.R.L.). Upwards of two hundred mature specimens obtained by Mr. J. Ray Hardy from a pile of rotten timber near some greenhouses at Gatley! ('J. of C.', vol. xii., p. 55).

Vitrea helvetica (Blum.). Barnton! Anderton! Marbury, near Northwich! (B.R.L.).

Vitrea helvetica v. *viridans* Ckll. Near Warrington, 1906 (Taylor, 'Mon.', vol. iii., p. 51). Oakwood, Romiley (J. W. Jackson, 'J. of C.', vol. x., p. 336).

Vitrea nitidula (Drap.) v. *helmi* Alder, Marbury, near Northwich! (B.R.L.). Compstall, January, 1903! (F. Taylor, 'J. of C.', vol. x., p. 305).

Vitrea radiatula (Alder). Weaverham! Barnton! (B.R.L.). Poynton (J. W. Jackson, 'J. of C.', vol. x., p. 336). Romiley! (C.O.).

Zonitoides nitidus (Müll.). Poynton (J. W. Jackson, 'J. of C.', vol. x., p. 336). Bredbury, May, 1896! Beeston Castle, September, 1900! Knutsford Moor, October, 1902! (C.O.).

Zonitoides excavatus (Bean). Marbury, near Northwich! Weaverham! (B.R.L.).

Zonitoides excavatus v. *vitrina* Fér. Marbury, near Northwich! Weaverham! (B.R.L.). Beeston Castle, September, 1900! Capesthorne, September, 1900! (C.O.).

Fam. ARIONIDÆ.

Arion ater (L.) v. *aterrima* Taylor. Sale! (Taylor, 'Mon.', vol. ii, p. 175). This form is not uncommon.

A. ater v. *rufa* L. Marple! (Taylor, 'Mon.', vol. ii., p. 181).

Arion subfuscus (Drap.) v. *succinea* Bouillet. Romiley! (Taylor, 'Mon.', vol. ii., p. 202).

Arion intermedius Norm. Goyt Valley, Taxal! Bosley! Wincle! Alderley Edge! Capesthorne! Weaverham! Swettenham! Beeston Castle! Crowden! (C.O.).

A. intermedius v. *plumbea* Collinge. Peover, J. G. Milne, August, 1885 (Taylor, 'Mon.', vol. ii., p. 247).

Arion hortensis Fér. v. *fasciata* Moq. Knutsford, Congleton (T. D. A. Cockerell, 'Nat.', 1886, p. 57).

Arion fasciatus Nilss. v. *neustriaca* Mab. Bowdon, Carrington, 1884, J. G. Milne (Taylor, 'Mon.', vol. ii., p. 232).

Fam. ENDODONTIDÆ.

Punctum pygmæum (Drap.). Weaverham! (B.R.L.). Minshull Vernon, October, 1902! (C.O.).

Sphyradium edentulum (Drap.). Weaverham! (B.R.L.).

Pryamidula rotundata (Müll.) v. *turtoni* Fleming. Gatley (J. W. Jackson, 'J. of C.', vol. x., p. 87).

Fam. HELICIDÆ.

Helicella caperata (Mont.). Near Beeston Castle Station, September, 1900! (C.O.). Banks of the Weaver at Barnton, April, 1905! (B.R.L.).

Helicella barbara (L.). The 'cop' at Burton Point, 1906! (C.O.).

Hygromia fusca (Mont.). Marbury, near Northwich! Weaverham! (B.R.L.). Beeston Castle, September, 1900!

Congleton, September, 1900! Swettenham, September, 1900! (C.O.).

Hygromia hispida (L.) v. *albida* Jeff. Marple (J. W. Jackson, 'J. of C.', vol. x,. p. 335). Barnton (B.R.L., 'J. of C.', vol. xi., p. 315).

Acanthinula aculeata (Müll.). Weaverham! (B.R.L.).

**Acanthinula lamellata* (Jeff.). The Quarry, Christleton, near Chester (H.G.B.). Authenticated by Mr. J. W. Taylor, 1886.

Vallonia pulchella (Müll.). Anderton! (B.R.L.). Marple (J. W. Jackson, 'J. of C.', vol. x., p. 335).

Vallonia costata (Müll.). Barnton! Weaverham! (B.R.L.).

**Vallonia excentrica* Sterki. Barnton, November, 1905 (B.R.L., 'J. of C.', vol. xi., p. 315).

Helicigona arbustorum (L.). Vale Royal! Weaverham! (B.R.L.). Beeston Castle! Congleton! Minshull Vernon! (C.O.).

Helicigona arbustorum v. *fusca* Fér. Holmes Chapel! (H.G.B.)

Helicigona arbustorum v. *conoidea* West. Holmes Chapel! (H.G.B.).

Helicigona arbustorum v. *fuscescens* D. and M. Holmes Chapel! (H.G.B.).

Helicigona arbustorum v. *flavescens* Moq. A broken shell of this variety with several of the typical form at a 'thrush-stone,' Whaley Bridge, August, 1896! (C.O.).

Helix aspersa Müll. Gardens at Alderley, 1900! and Knutsford, 1903! Not indigenous in either locality.

Helix nemoralis L. v. *castanea* Moq. Chester! (H.G.B.).

Helix nemoralis v. *roseolabiata* Taylor. Bandless yellow shells with pink lip, Chester! (H.G.B.).

Helix hortensis Müll. Holmes Chapel! (H.G.B.). Winnington! Acton Bridge! (B.R.L.). Bickerton! Great Budworth! Knutsford! (C.O.).

Helix hortensis v. *coalita* Moq. Holmes Chapel! (H.G.B.). Winnington! (B.R.L.). Compstall (R. Standen, 'J. of C.', vol. x., p. 182). Knutsford! (C.O.).

Helix hortensis v. *lutea* Moq. Holmes Chapel! (H.G.B.). Winnington! Acton Bridge! (B.R.L.). Disley! Bickerton! (C.O.).

Helix hortensis v. *arenicola* Macgill. Chester! (H.G.B.). Compstall (R. Standen, 'J. of C.', vol. x., p. 182).

Fam. ENIDÆ.

Ena obscura (Müll.). Barnton! (B.R.L.).

Fam. Stenogyridæ.

**Opeas goodalli* (Miller). In 1906 Mr. R. Newstead sent me specimens from a greenhouse at Chester!

**Subulina octona* (Chemnitz). Orchid-houses at Fulshaw, Wilmslow, 1900! (C.O.).

Azeca tridens (Pult.). Congleton, September, 1900! (C.O.).

Fam. Vertiginidæ.

Jaminia anglica (Fér.). Abundant at Marbury Mill, near Northwich, 1898! (B.R.L.).

Jaminia muscorum (L.). The 'cop' at Burton Point, 1906! (C.O.).

Vertigo antivertigo (Drap.). Mr. Lucas has taken this species on *Scrophularia aquatica* in a reed-bed at Marbury Mere, near Northwich!

Vertigo substriata (Jeff.). Abundant, Weaverham, January, 1900! (B.R.L.). Romiley! (F. Taylor, 'J. of C.', vol. x., p. 305).

Vertigo pygmæa (Drap.). Barnton! (B.R.L.). Marple (J. W. Jackson, 'J. of C.', vol. x., p. 215).

**Vertigo pusilla* Müll. The inclusion of this species in the Cheshire fauna did not seem justifiable on the evidence at my disposal in 1896 (*cf.* 'Nat.', 1896, p. 119), but Mr. R. Standen has recently traced two of the specimens taken at Marple by J. Hardy, in 1864! In his note on the subject ('J. of C.', vol. xii., p. 64) he refers to other specimens taken at Marple by the late James Walkden, by Mr. J. R. Hardy in 1860, and by Mr. E. Collier and himself in May, 1899.

Fam. Clausiliidæ.

Clausilia laminata (Mont.). Minshull Vernon, October, 1902! (C.O.).

Clausilia bidentata (Ström.). Barnton! Weaverham! Marbury, near Northwich! (B.R.L.). Beeston Castle! Minshull Vernon! (C.O.).

Fam. Limnæidæ.

Acroloxus lacustris (L.). Romiley! Brereton! Alderley Edge! Lindow! On dead beech leaves, Marbury Mere, near Northwich, July, 1904! On stems of *Nymphoides peltatum*, Oulton Pool, April, 1905! These shells, elevated and compressed laterally, were apparently referable to the var. *moquiniana* of Bourgiugnat; their form was obviously the effect of individual adaptation to environment (C.O.).

Limnæa auricularia (L.). Middlewood (C. H. Moore, ' J. of C.', vol. x., p. 336). Brereton ! (C.O.).

Limnæa auricularia v. *acuta* Jeff. Marbury Mere, near Northwich, August, 1905 ! (C.O.).

Limnæa pereger (Müll.). v. *maritima* Jeff. Leasowe (R. Standen, ' J. of C.', vol. x,. p. 258).

Limnæa stagnalis (L.) v. *fragilis* L. Marbury, near Northwich (B.R.L., ' J. of C.', vol. ix., p. 151).

Limnæa stagnalis m. *scalariforme.* Cranage ! (H.G.B.).

Limnæa glabra (Müll.). Knutsford ! Comberbach ! Middlewich ! (B.R.L.). Antrobus ! Romiley ! Lindow ! Lower Peover ! (C.O.).

Planorbis corneus (L.). Abundant in ponds near Chester, where it was introduced in the early ' eighties,' 1901 ! (R. Newstead). Alderley Edge ! (H.G.B.). Peak Forest Canal, Marple, April, 1896 ! Booth's Mere, Knutsford, May, 1901 ! (C.O.). There is no reason to think that this species is indigenous in Cheshire.

**Planorbis dilatatus* Gould. A few in the Peak Forest Canal, Dukinfield, November, 1900 and March, 1901 ! (C.O.).

Fam. PHYSIDÆ.

**Physa heterostropha* Say. Shropshire Union Canal, Chester, January, 1898 ! Trent and Mersey Canal, Sandbach, November, 1900 ! (B.R.L., ' J. of C.', vol. x., p. 34). Abundant in the Peak Forest Canal, Dukinfield, November, 1900 ! (C.O.).

Aplecta hypnorum (L.). Cranage ! (H.G.B.). Romiley ! Lindow ! Lower Peover ! (C.O.).

Fam. PALUDESTRINIDÆ.

**Paludestrina jenkinsi* (Smith). The species was first obtained in Cheshire by Mr. B. R. Lucas, who collected specimens in the Trent and Mersey Canal, at Middlewich, in August, 1899 ! In September, 1900, I took it in the Shropshire Union Canal, near Beeston Castle Station ! in the Trent and Mersey Canal, near Sandbach ! and in the Peak Forest Canal, at Dukinfield ! (' J. of C.', vol. x., p. 42). It has since been found in the Shropshire Union Canal, at Chester, 1903 ! (B.R.L.), in a small reservoir formed by draining the Cogshall Brook, near Northwich, March, 1903 ! (C.O.), in the Peak Forest Canal at Marple, April, 1904 ! (F. Taylor), and in Marbury Mere, near Northwich, July, 1904 ! (C.O.). *P. jenkinsi* has now obtained a firm footing in our waterways, and we may expect that so pushful and prolific a colonist will before long be one of the most widely spread and abundant species in the county.

Paludestrina jenkinsi v. *carinata* Smith. Trent and Mersey Canal, Sandbach, 1900 ! (C.O.). Shropshire Union Canal, Chester, 1903 ! (B.R.L.). Trent and Mersey Canal, Lach Dennis, 1903 ! (C.O.).

**Paludestrina taylori* Smith. This alien species was described by Mr. E. A. Smith in the 'Annals and Magazine of Natural History' (1901, p. 191) from specimens obtained by Mr. F. Taylor in the Peak Forest Canal at Dukinfield, in September, 1900. In April of that year Mr. Taylor had collected specimens in the Canal at Droylesden, Lancashire, a few miles from Dukinfield, and connected with that place by water. He found it subsequently at several places in the Canal between Dukinfield and Hyde, where, judging by its abundance—I took hundreds of specimens in a bed of *Glyceria aquatica* at Dukinfield in September, 1900—it had been established for some time, but of its native habitat and the manner in which it reached this country nothing is known. An interesting account of its life-history and reproduction is given by Messrs. Jackson and Taylor, in the 'J. of C.', vol. xi., pp. 9-11.

Fam. VIVIPARIDÆ.

Vivipara contecta (Millet). Pond, Alderley Edge ! (H.G.B.). Not indigenous in Cheshire.

Fam. VALVATIDÆ.

Valvata piscinalis (Müll.) v. *antiqua* Sow. Marbury Mere, near Northwich, July, 1904 ! (C.O.).

Valvata piscinalis m. *sinistrorsum.* A reversed example from Marbury Mere, near Northwich, 1905, was exhibited by Mr. B. R. Lucas at the Annual Meeting of the Conchological Society for that year ! ('J. of C.', vol. xi., p. 268).

Valvata cristata Müll. Middlewich ! (B.R.L.). Tabley Pool, 1903 ! Witton Flashes, near Northwich, 1903 ! (C.O.).

PELECYPODA.

Fam. DREISSENSIIDÆ.

Dreissensia polymorpha (Pallas). Shropshire Union Canal, Beeston Castle, September, 1900 ! (C.O.).

Fam. UNIONIDÆ.

Unio pictorum (L.). Shropshire Union Canal, Beeston

Castle, September, 1900! Macclesfield Canal, near Astbury, July, 1903! (C.O.).

Anodonta cygnea (L.) v. *rostrata* Ross. Tabley Pool, February, 1903! (C.O.).

Anodonta cygnea v. *incrassata* Shepp. Holmes Chapel! (H.G.B.).

Anodonta anatina (L.). Booth's Mere, Knutsford! Pond, Alderley Edge! (H.G.B.). Redes Mere! (C.O.).

Fam. CYRENIDÆ.

Sphærium rivicola (Leach). Shropshire Union Canal, Beeston Castle! (C.O.).

Sphærium corneum (L.) v. *scaldiana* Norm. Canal, Beeston, Castle! September, 1900! (C.O.).

Sphærium corneum v. *nucleus* Stüder. Rowton Grange, near Chester! (H.G.B.).

Sphærium lacustre (Müll.). Brereton Pool, November, 1896! Alderley Edge, March, 1899! Congleton, September, 1900! Shells with straw-coloured epidermis associated with *S. corneum* of the same colour, Knutsford, November, 1901! (C.O.).

Sphæruim lacustre v. *ryckholti* Norm. Mollington, near Chester! (H.G.B.).

Sphærium lacustre v. *rotunda* Jeff. Rowton, near Chester! (H.G.B.).

Sphærium lacustre v. *brochoniana* Bourg. Bache, near Chester! (H.G.B.). Shropshire Union Canal, Beeston Castle, September, 1900! Trent and Mersery Canal, Sandbach, September, 1900! (C.O.).

Sphærium pallidum Gray. Abundant in Trent and Mersey Canal, near Sandbach, September, 1900! (C.O.).

Pisidium amnicum (Müll.). Tarvin! (B.R.G.). Shropshire Union Canal, Beeston Castle! Middlewich! (C.O.).

Pisidium henslowianum (Shepp.). Pond, Dean Row, August, 1899! Shropshire Union Canal, Beeston Castle, September, 1900! Macclesfield Canal, Congleton, September, 1900 (C.O.).

Pisidium nitidum (Jen.). Stalybridge! (C. H. Moore, 'J. of C.', vol. x., p. 336). Knutsford, 1901! Mobberley, 1902! Mouldsworth, 1902! (C.O.).

Pisidium gassiesianum Dupuy. Alderley Edge, 1898! Wilmslow, 1899! Tabley Pool, 1903! (C.O.).

THE DOG'S MERCURY.

JAS. E. McDONALD.

Though not looked upon with very much favour by lovers of wild flowers in general, the Dog's Mercury (*Mercurialis perennis*) offers many points of interest in its life history. Its habit of boring through the soil in early winter giving promise, by its greenery, of the balmier days of spring, and here and there opening a few of its inconspicuous, but none the less welcome flowers early in January,* suffice in themselves to make it worthy of notice.

As herbaceous plants go, it may be considered almost evergreen : by the time the stems of one year have departed some of those for the succeeding year will have already emerged from the soil, and though the leaves are yet unfolded, the flower buds are evident sometimes as early as October.

Like the Stinging Nettle, the Butterbur and some other diœcious perennial herbaceous plants, the Dog's Mercury grows in clumps or ' colonies ' of one sex, though usually a colony of the opposite sex occurs in the near vicinity. This feature in each case may be explained as follows :—A seed on finding a suitable place, germinates, and in the course of time arrives at maturity. Both before and after this stage, branches are given off below ground, which spread in various directions, sending up shoots to the surface at intervals. Each seed furnishes a plant of one sex only, hence a colony of the same sex is formed.

The course of development of the Dog's Mercury from seed to maturity is as follows :—During July, when the capsules on the female plants are ripe, the seeds are discharged with some force. After reaching a suitable place—hedges or thickets —a period of apparent rest of several months ensues. During this time the hard shell (testa) protects the enclosed plantlet and its food (endosperm).

Germination takes place sometimes in October and sometimes in the February following. Usually the seed leaves (cotyledons) remain face to face within the hard shell below ground (hypogeal) for some time at least, even after absorbing the endosperm and the plumule has emerged from the soil.

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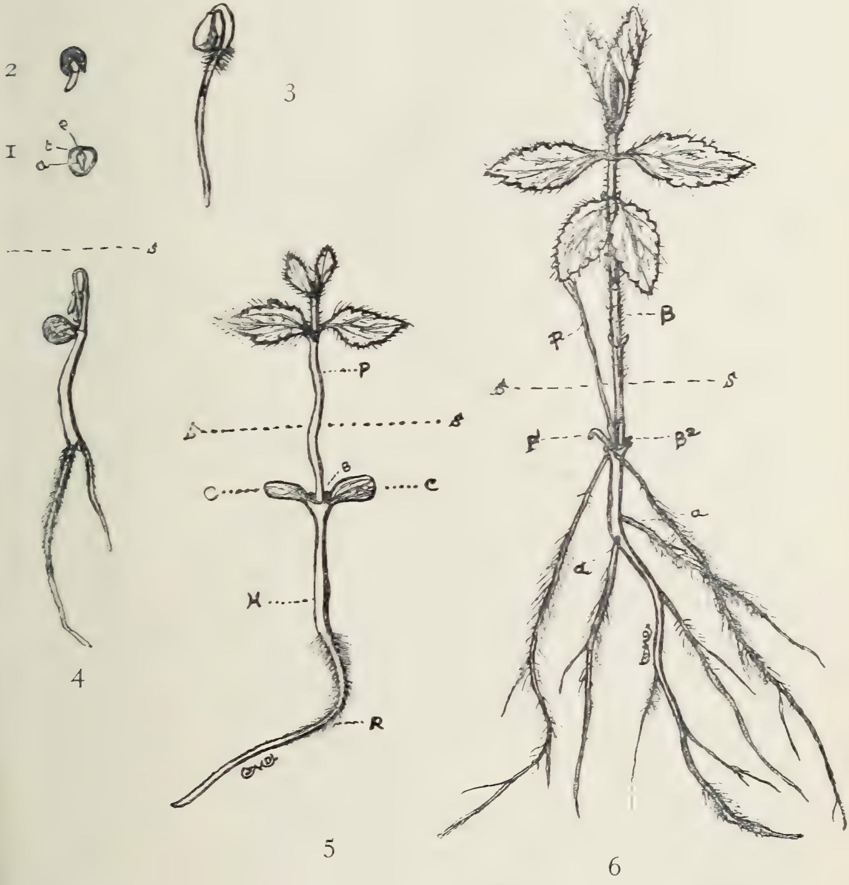
* In a certain sheltered woodland near Stockport the writer has gathered specimens, several years in succession, of both staminate and pistillate forms with some flowers open the first week in January.

But, it occasionally happens that a seed germinates very near to the surface, and then, after absorbing the endosperm, the seed leaves are freed from the testa, appear just above the surface (epigeal), separate from each other, and turn green. When such is the case, the hypocotyl rises from the soil in the



1. Section of seed: *a*, endosperm; *t*, testa; *e*, embryo. 2. Seed germinating. 3. Later stage of germination (seed coat removed), hypocotyl arched. 4. Still later stage; plumule arched; *s*, surface of soil. 5. Seedling, end of first season's growth; R, radicle; H, hypocotyl; C, cotyledons (spreading due to removal of seed coat); B, bud in axil of cotyledon; *p*, plumule; *s*, surface of soil. 6. Seedling, second year (April); *a*, adventitious roots; B, shoot developed from bud, *b* in fig. 5; P, remains of plumule; B^1, the opposite cotyledonary bud beginning to grow; B^2, bud in axil of scale leaf at base of shoot B, this would form shoot next year; *s*, surface of soil.

form of an arch, and the plumule behaves in the manner refered to further on.

After growing a few inches in height the plumule straightens itself, the hypocotyl becomes somewhat thicker, and later on gives off several adventitious roots from near the level of the cotyledons, which grow obliquely downwards and assist in pulling the young plant deeper in the soil. Towards August the plumule gradually dies down to a point a little above its base, then the remaining portion of the young plant, now buried in the soil, comes to rest. Early the following year a bud, formed in the axil of one of the colytedons, grows up to form the new stem, emerging from the soil in the same arched manner as the plumule did, and as, indeed, all the aerial shoots do whether from seedling or mature plant. This shoot grows a little larger than the plumule did, and like it, sends down reserve food to the neighbourhood of the hypocotyl. A bud is also formed in the axil of the other cotyledon, but usually one remains undeveloped the first season or two, but ready to take the place of the other shoot if any accident should befall it.

On the approach of winter the second shoot decays, to be replaced the next season by another one formed from a bud in the axil of a scale-leaf near its base.

The bud from the axil of the opposite cotyledon may now also push its way up to the surface to form an additional shoot, and the process described for the other repeated. Each succeeding year the new shoots are gradually increased in number, and become larger until maturity is reached. Some of the shoots formed after the first two or three seasons do not grow directly upwards, but obliquely, through the soil, and after they have died down to the surface they are replaced the succeeding season by others from buds at the nodes near the tips of the stems left after decay of their aerial portions. In this manner the plant comes to occupy a greater area, and judged from above would seem to consist of many individuals, whereas they are connected together by the underground portions, sometimes for many years, and thus the unisexual colony is established. If accident befalls any of the aerial shoots, there are always subterranean buds ready to make up the loss. Fig. 7 is a rough plan of the branching of part of a mature plant, which will help to make the foregoing description clear. As the shoots grow successively larger, so do the leaves borne by them.

A shoot similar to those marked C and C^1, Fig. 7, was obtained by the writer, which measured over a foot in length from its base to the point where it emerged from the soil ; it had three internodes.

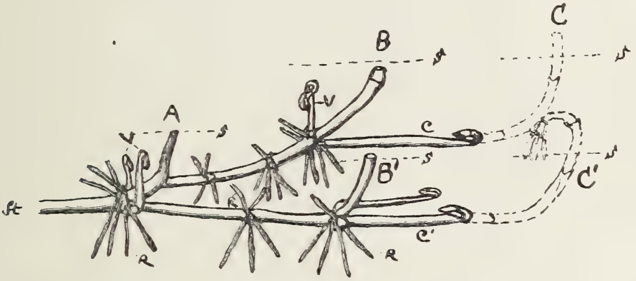


Fig. 7.—Diagram of underground branching of a mature plant, end of September ; A, decayed base of aerial shoot of last year ; *st.* undecayed underground portion ; B, B,^{1} points to which aerial shoots of this year will decay ; C, C^1, where aerial shoots for next year will emerge, dotted portions represent further growth of the at present horizontally growing shoots C, C^1 ; R, roots from nodes ; *s*, a little above surface of soil ; *v*, vertical shoots that take no part in the spreading process.

For details of the manner and advantages of the arched method of emergence, particularly in respect to seedlings, the reader is referred to Darwin's book, ' The power of movement in plants.'

In the Dog's Mercury, the young leaves have each half of the blade rolled to the middle of the upper surface (involute). The rather thick and tough midrib projects and helps to protect the lamina. All the leaves and stipules fit together at this season in such a way that they form a conical surface attached at its narrow end to the stem. They offer little resistance, and the displaced particles of soil slip over without injuring as the cone is drawn upwards. Speaking of the arching of the hypocotyl in respect to seedlings, Darwin says ' that an increased force is also gained by the arching, for both legs of the arch increase in length and both have points of resistance, the basal leg meets with resistance by the root at its base, and the apical leg meets with resistance so long as the seed leaves are still in the testa, so that the arch is pushed up with a double force.' The basal leg of an arched shoot of Dog's Mercury meets with resistance, and it is possible also that owing to the rolled leaves growing in length whilst still in the soil, their tips meet with resistance by the soil and if so, to some extent, the apical leg may assist in pushing the arch upwards. But even if this possibility be acknowledged, the longer basal leg exerts the greatest force as the young leaves of the apical leg are not sufficiently rigid to offer any great support.

There is also the probability that a side to side movement (nutation) as far as the soil will allow, assists the rising arch in displacing the soil. Suppose a longitudinal half of a leg is growing quicker than the other half, say the outer half of the basal leg, the arch would be pushed towards the apical leg, and in this it might be assisted by the inner half of the apical leg growing quickest. Suppose the first figure (Fig. 8) presents the legs and arch when the latter is not leaning either way, then the state just mentioned might be represented by the middle figure ; when the reverse portions were undergoing quickest growth the arch would be pushed over to the basal leg as in the third figure.

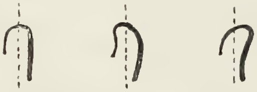


Fig. 8 (For explanation see text).

Such a procedure is many times repeated, though more complicated than just described, until the arch and apical leg are well out of the soil when, having reached the light, the whole inner surface grows quickest until the stem is erect.

The fact that the stem often remains arched for some time even after having emerged from the soil is suggestive that this may be a means of protection against miniature landslips, a feature so often noticeable about this season on the banks of wooded ravines which it often frequents. It may be observed further that when a portion of the rhizome, as occasionally happens, is not actually buried the shoots developing from it grow for some time in the same arched manner, and further, when a seedling has its seed leaves above the soil the plumule behaves similarly. This same bending, too, in conjunction with the rolled leaves, is a protection against chill by radiation of heat, and prevents the leaves from becoming wetted with cold rain, etc.

The internodes of the underground portions of stem are from two to five inches long in a loose soil, rather shorter in a stiff one, and from six to twenty tough roots grow downwards from every node, so that this dense net work of roots and stems makes it very difficult for any other plant to grow beneath them.

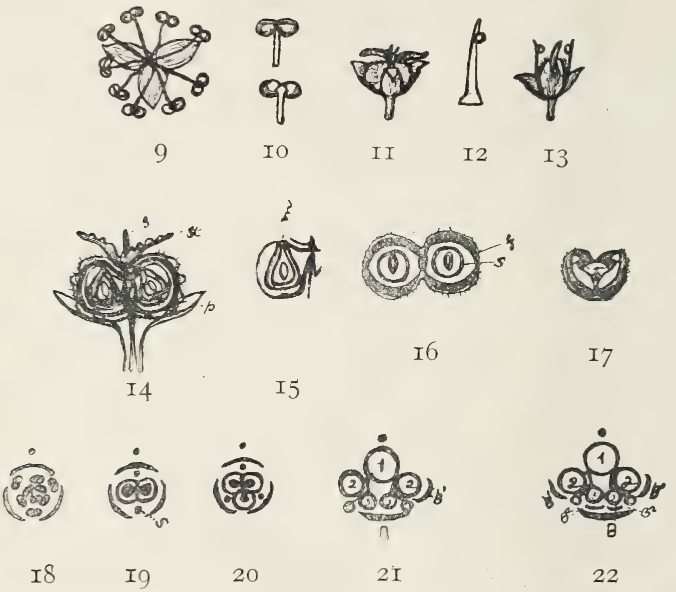
When expanded, the decussately arranged leaves are seen to be oblong, lanceolate, serrate, and stalked, with two small subulate stipules at the base of each. On the underground portion of stem, and towards the base of the aerial portion, neither foliage leaves nor stipules are developed, only scale-leaves whose office is that of protecting the delicate apex whilst it is making its way through the soil (Fig. 7). Both stem and leaves are hirsute. Like the leaves of many other shade-loving plants, their epidermal cells contain some chlorophyll granules, as in such cases they have not to be protected from excessive light.

As previously stated, the flowers are of two kinds, occurring on separate plants belonging to separate colonies, and though of a somewhat simple character compared with others belonging to the same natural order (Euphorbiaceæ) they are pregnant with interest.

They are arranged on spikes which arise from the axils of some of the lower foliage leaves. The staminate (male) spikes bear a number of flowers arranged in little definite clusters (glomerules) see diagrams (Figs. 21 and 22). Each staminate flower consists of a green three-lobed perianth, and from nine to twelve, occasionally a few more, stamens with rather long filaments, the dilated connective bearing two nearly globular anther lobes (Fig. 10). The pistillate spikes are few-flowered, each flower has a similar perianth, a two-lobed and two-celled hirsute ovary, each cell containing one pendant inverted (anatropous) ovule. On the summit of the ovary are two curved styles, their upper or stigmatic surfaces being warty. Alternating with the lobes of the ovary, that is one on each side, are two awl-shaped filaments, which are usually looked upon as degenerate stamens (staminodes) (Fig. 12.)

Kerner makes the remark that no structure however inconspicuous in any plant, but has some function or it would not be retained. To the writer it was a puzzle for a long time what the function of these staminodes could be, and the solution came as a surprise and unexpectedly.

To any additional organ in a flower other than perianth, stamens, or pistil, Linnæus applied the term nectary, and this term was applied to the staminodes in the pistillate flowers of the plant in question. Many of the organs thus designated by him have, however, been proved not to be nectariferous, but whether the true function of those of the Dog's Mercury were known, or if they ever have been described as functional nectaries, the writer has met with no evidence. Such, however, is the case, they are indeed functional nectaries.* During the time that the stigmas are in the receptive condition (*i.e.* ready for pollination), careful examination will reveal the fact that



9. Staminate flower. 10. Stamens (two views). 11. and 13. Pistillate flowers (two views), position of honey shown in fig. 13. 12. Staminode with drop of honey. 14. Longitudinal section of pistillate flower; *p*, perianth; *st*, style, upper surface stigmatic; *s*, staminode. 15. Ovule; *m*, micropyle. 16. Transverse section of fruit just previous to dehiscence; *s*, seed; *f*, fibrous wall of pericarp which brings about dehiscence. 17. Single carpel dehiscing to scatter the seed. 18. Diagram of a typical staminate flower. 19. Diagram of a typical pistillate flower; *s*, staminode. 20. Diagram of a pistillate flower having a three-lobed ovary. 21. Diagram of a group (glomerule) of flowers from a staminate spike. 22. Diagram of a group having an unusual number of bracts; circles represent flowers, largest first to open, &c.; B, bract; B^1, secondary bracts; B^2, tertiary bracts. Typically only one bract and one secondary bract are present as in fig. 21. Figs. 9, 11, 13, 16, 17, enlarged: Figs. 10, 12, 14, 15, further enlarged.

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* I first observed this feature in April 1905. A brief description is given on page 7 of the 'Report and Proceedings of the Manchester Field Naturalists' and Archæologists' Society for 1905.'

towards the apex of each of the awl-shaped filaments—perhaps the term 'staminodal nectaries' is permissable — there will be a minute drop of honey which has been excreted through a pore. These drops are excreted almost on a level with the stigmas and on the side facing them. Often a drop falls on the stigmas, but it is shortly replaced by another.

The flowers of both kinds begin to open before the leaves have entirely unrolled, and often before the stem has straightened itself. The flower spikes on each plant tend to approach each other, the staminate ones above the foliage. This feature and the yellowish hue of the stamens make the staminate ones more conspicuous than the pistillate ones, which do not reach above the foliage. The flowers of the Dog's Mercury are often quoted as being pollinated by the wind. There are several circumstances which seem to point to this, such as the apparent inconspicuousness of the flowers and their manner of clustering. The staminate flowers open with some force, and perhaps scatter some of the pollen in the act. They only remain on the spike the day they open, then they fall off to make room for the succeeding flowers of the clusters to open. The foliage at this period does not offer much obstruction to the dissemination of the pollen. The clustering of the pistillate flowers towards the side from which the pollen may be expected also appears to favour wind pollination. However, it is interesting to know that midges and other, chiefly small, insects frequent both kinds of flowers on warm days, the staminate flowers furnishing them with pollen to eat—though their juicy-looking perianths may assist in attracting them—and the pistillate ones with nectar. It is very difficult to follow the movements of such minute and elusive insects on the flowers, but by using patience and stealth the writer has seen some actually licking the honey and others eating the pollen.*

If, after foraging amongst staminate flowers they adjourn for liquid refreshment to the nectaries of the pistillate flowers, they can scarcely help but deposit pollen on the stigmas on which they alight in order to reach the honey, thus bringing about insect pollination. Moreover, the flowers have a peculiar odour quite distinct from that of the bruised foliage,* and to the writer and several friends is suggestive of the rather nasty odour given off by the flowers of the Privet (*Ligustrum vulgare*). This odour may be the chief means of attracting the midges, etc. Probably both wind and insect pollination occurs. The clustering of the flowers is advantageous to both kinds of pollination, though more information on this point would be welcome. Considering the number of pistillate flowers, the percentage of ripe seeds one can gather in a season is not a great one. Possibly, in spite of efficient pollination the cold weather prevailing during the flowering season is unfavourable to fertilization. I cannot bring myself to look upon the rather low percentage as due to vegetative multiplication, as has been suggested, for wherever both sexes grow near together seedlings may be found almost every year; at least, that is my experience.

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* Some insects, which were seen by the writer on warm evenings flying from one sex to the other where both sexes were growing practically together, appeared to belong to a black species of gnat. Several of these were seen to lick the honey. The midge *Physchodo* was seen on both kinds of flowers, as was also the comparatively large dung fly *Empis livida,* and further, he has caught several small ants licking the honey.

After the flowering period is over the peduncle of the staminate spike usually falls away, leaving a small scar where it left the stem. The stem itself continues to grow till late summer in both staminate and pistillate plants, so that in the latter the developing fruits are partly hidden. Some of the fruits ripen towards the end of June. The lobes then split apart, technically the fruit is a schizocarp dehiscing septicidally into two mericarps or cocci, and each lobe (mericarp, carpel, or coccus), further dehisces elastically in a loculicidal manner, ejecting the seed with great force (Fig. 17). Many of the seeds of the order Euphorbiaceæ have a small fleshy appendage near the micropyle termed the caruncle. When the seeds of Dog's Mercury are examined, it will be found that traces of this caruncle are present, though it does not become fleshy. This character is a little more pronounced in the Annual Mercury (*Mercurialis annua*). A few comparisons with the latter may not be out of place. In this mercury the cotyledons are usually epigeal, and rise some distance above the soil. The cotyledonary buds, as do other buds from the foliage leaves, grow into branches. As we have seen, buds are not formed above ground in the Dog's Mercury, or rather they do not develop. The leaves of the Annual Mercury are more ovate, bright green, and smooth. The flowers are similar in structure, though somewhat smaller ; the pistillate ones are nearly sessile and have similar staminodal nectaries, and the hairs on the ovary are bulbous at the base. When drying, both kinds turn blue, and both are reputed poisonous.

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* After gathering a few specimens with flowers open, the leaves were bent downwards and worsted wound gently round to keep them in that position, the flowers being then clustered above the foliage. After allowing a little time for the smell of bruising to fade away, the distinct odour of the flowers was perceived.

Many minor variations occur in the Dog's Mercury, due sometimes to position, to soil, or to accident. The most noteworthy that have come under my observation are given below.

Knowing that many organs which are looked upon as degenerate (vestiges) sometimes abnormally revert as it is termed to the original structure, I have examined a great number of pistillate flowers to see if any of the staminodes bearing traces of anthers at their tips could be found, but in this respect without success. However, the search revealed occasional specimens where stamens were present, along with the staminodes and pistil in the same flower, and a number of examples from different localities where both staminate and pistillate flowers were present on the same spike, making these plants exceptionally monœcious, and also in two instances pistillate flowers with distinctly three-lobed ovaries, three styles and three staminodes, of which a diagram (Fig. 20) is given.

It will be remembered that the spurges belonging to the same natural order have typically three-lobed ovaries.

In some localities some of the mature shoots may frequently be found flowering sparingly in autumn ; but the probability of ripe seeds being formed from such belated (?) specimens is very remote indeed.

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From Messrs. Constable & Co. we have received the first two parts of **'The Country Home'** a new monthly, issued at 6d. net. It has a very attractive cover, and deals with old houses, furniture, horticulture, motoring, botany, the making of lawns, caterpillars and their protective devices, and other subjects likely to be of interest to those who occupy a country home.

Naturalists and would-be naturalists are well catered for now-a-days, and recently there has been quite a crop of new publications for their benefit. From Messrs. Cassell we have just received part I. of **'The Nature Book'** (7d., to be completed in 24 fortnightly parts). The frontispiece is a coloured reproduction of a painting, ' A Kentish garden,' by Mrs. Allingham. Mr. Crane writes on the Love of Nature ; Mr. Bird writes on Birds ; Mr. English describes wild animals (? mammals) ; Mr. W. J. S. Lockyer tells of the clouds ; Mr. Fitzgerald informs us how to know the wild flowers ; and Mr. Henry Irving photographs and describes the trees. There is an excellent collection of illustrations from photographs, though many of them seem fairly familiar to us.

THE BIRDS OF NORTH-WEST LINDSEY.*

MAX PEACOCK,
Cadney, Brigg, Lincs.

MAGPIE.—Was formerly very common at Bottesford, but its numbers without apparent cause have declined of late years. In 1875 flocks of over thirty old and young birds together were not uncommon in the early autumn. Generally it is common in the district. It is most variable in its nesting places. The tops of the loftiest trees at Cadney are sometimes forsaken suddenly for hedges or isolated thorn bushes, when frequently the nest is only from six to eight feet from the soil. A well-known horse dealer of Lincoln, not long ago, was going to Horncastle fair. By the road-side he passed a magpie hanging outside a house in a cage. He called on the owner, and asked if it were for sale ; and learning that it was, paid ten shillings down for it on the spot. Taking the unlucky bird, he wrung its neck, saying as he did so to his friends that he would as soon meet the devil as a magpie. If he had passed it without notice, he would have had no luck at the fair, nor for the next year to come. This is the way ancient folklore lasts with us, dying a hard and cruel death.

JACKDAW.—Is fairly common, but not as plentiful as formerly, *i.e.*, before Bottesford Church was restored. With us they also build in hollow trees. On Manton Common for over a hundred years they have used the rabbit holes. They rob the nest of the Black-headed Gull from Twigmoor, which is about a mile off, and the wild fowl on the duck pond on the Common. As six species of ducks breed in the neighbourhood, the Jackdaws had a good time till lately in the spring and early summer. Mr. Young says 'Numerous, and I am puzzled to know where they all nest. From places I have known them select, I fancy they find the problem not a little puzzling.' In the ruined Church at Cadney there are more than a score of breeding pairs. I had a very beautiful black and white specimen shot at Messingham Water Mill in 1863.

CARRION-CROW.—Is fairly common throughout the district. Only one built in Bottesford parish in 1878, but more since.

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* See 'Naturalist' for first paper, 1902, pp. 197-204; second paper 1906, pp. 42-47.

In Poolthorn Covert, Cadney, there were ten nests in forty square yarns of wood, in 1895, six nests in 1898, but far more scattered over the whole Covert. At Howsham, close by, in 1900, forty chickens were carried off in three days from one lot of fowls, by two crows, presumably a pair, from Poolthorn Covert. 'Common about Market Rasen, few being killed by keepers,' Mr. Young says.

HOODED CROW.—This is only with us as a winter migrant. I have seen it as early as 7.9, 1889. The usual time is the last week in October. The colours on this variety vary greatly. Sometimes the grey is most marked, sometimes the black. I have heard that Hooded and Carrion Crows have been known to breed together in the Eastern Woods, and there was undoubtedly a case in South Lincs. Personally I have never met with such a combination.

ROOK.—Is far too common. New rookeries are being formed all over North-West Lincs. There is only a proper food supply for a limited number of these birds, and the result is they have become very much more destructive within the last thirty-five years. Game, eggs, and young poultry, and all farm produce suffer in proportion as this species increases. I have seen a cream-coloured and a brown specimen, shot by the late Tom Nicholson, of Greyingham Warren (Div. 5), in 1851. In November 1899, the Vicar saw, from the railway, three pure white specimens, in a huge 'cawing' of migrants he believed, in Usselby parish. A rookery is worth two shillings per nest for the sport of young rook shooting.

SKY-LARK.—Is very common, and very destructive in wheat and spring corn fields. First nest in 1890, on the 17th of April, with two eggs.

WOOD-LARK.—Is very rarely found nesting in the Eastern Woodlands. I have never seen it myself, but the Vicar, and others have seen the bird during the breeding season.

SWIFT.—Comes to us every season. Formerly they bred in the tower of Bottesford Church, but not since its restoration in 1870. They have for many years (1887), built annually under the tiles of the roof of the house occupied by the Postmaster, Mr. James Kendal, at Ashby. Formerly they bred under roof tiles at Yaddlethorpe, but in 1900 were using the abandoned Sand-Martin's holes in the Liassic-drift gravel pit there. This species is always called the Devilin in this district.

NIGHTJAR.—Can hardly be called common now. It was formerly found round the Manor House at Bottesford, on sandy soils, but not since 1872. I saw one in the Snake Plantation in 1889. The late George Tacey took me eggs from a nest in the Decoy Plantation, Ashby. They are to be found in Cole's Plantation, too, every season. I shot one there that had a very small lizard (*Lacerta vivapara*, Linn.), in its crop. It is fairly common in the Eastern Woods. In 1895, the Vicar and I saw a pair of old birds, their newly hatched young, and broken egg sheels in Sweeting Thorns Wood. These birds were very fearless. No bird is better adapted for personal study than the Nightjar. It soon gets to know you, and will come and sit on your hand, or let you stroke it while on the nest. It is a sand-land bird, where there are scattered or no trees, as on Linwood and Scotton Commons. Mr. Burton says, 'One was shot in my next neighbour's garden.' 'W. S.' wrote from Nottingham to 'The Shooting Times' in reply to a letter of the Vicar's on the Rock Dove:—'It may also interest the same gentleman to hear that during the second week in September, 1900, very late in the evening, I observed a nightjar "hawking" along the edge of the water between Mablethorpe and Sutton-on-Sea, the tide being about 250 yards out at the time. I was greatly surprised to find the bird in that neighbourhood, as I was under the impression it was never found far away from the vicinity of woods and plantations, which in that locality are conspicuous by their absence. I may mention that just previous to sunset the beach for miles is literally swarmed with millions of insects commonly known as "Daddy Long-Legs"—in fact, so thick were they as they drifted before a rather strong breeze, that they had the appearance of thin wreaths of dark-coloured smoke. Perhaps the fact mentioned above accounts for the bird being seen as stated so far away from its usual haunts.' Though this is quite out of my district, I think it is worth recording in 'The Naturalist.' The Nightjar was on migration no doubt.

WRYNECK.—I have never seen at Bottesford. It breeds in the Eastern Woods. The Vicar has seen it at Cadney, and heard of it at Somersly. Mr. Burton says, 'Heard occasionally in my garden in spring.'

GREEN WOODPECKER.—Is generally distributed in suitable localities all over the district. It may often be caught feeding on the ground, but at once retires behind a tree till the intruder has passed. In 1887 I shot one while it was engaged in eating aphides from swede turnips. The plants were black over with insects. Much destruction is caused to ashes in our woods by this species making its nesting holes. Starlings drive the lawful makers of the holes away time after time, with the result that many trees are so injured that they snap off in heavy south-western gales.

Great Spotted Woodpecker.—Only visit Bottesford at rare intervals. The last I saw was in Holme Wood, Messingham, 1889. It breeds in the Eastern Woods regularly; and I have records of it in Divs. 1, 2, 3, 5, 7. It has been recorded for South Kelsey; and is 'probably fairly common in the Rasen district in several woods, Claxby, Willingham, &c.,' Mr. Young says.

Lesser Spotted Woodpecker.—Rarely wanders as far as Bottesford from its breeding ground in the Eastern Woods. Mr. Burton says, 'A few always about Gainsborough.' I have records for Divs. 2, 3, 5, and 7.

Kingfisher.—Is a nesting resident, only driven from the district during great frosts. Then it moves to the sea-shore. It nests away from the water at times; I found one in Yaddlethorpe Gravel Pit on October 7th, 1887. In 1888 I saw five together at once. Divs. 1, 2, 3, 5, and 7.

Hoopoe.—Reaches us as a rare wonder at times. A pair was shot early last century in the Eastern Woods at Scawby. Another pair frequented the garden of a house at Brumby for at least a week in 1893. Mr. E. Garnell showed them to me, but, if they were not shot, they did not remain to breed. My last record is my nephew's at Cadney:—'The Naturalist,' 1907, p. 61. A pair has attempted to breed just outside my district, near Rasen.

Cuckoo.—Is very common all over. I have found the eggs of this species in the nests of the following birds:—Pied, Grey, and Yellow Wagtail, Hedge Sparrow, and Meadow Pipit. For once it is found in any other nest, it is twenty times in that of the Pied Wagtail. I believe it is only put into the nest of any other species when the hen Cuckoo does not know of a Pied Wagtail's nest, and must place her eggs somewhere. The colour type of our local eggs copy this species. I have never seen the blue or the red type. The Cuckoo is generally heard and seen on April 23rd, but in cold, backward spring, May 7th is the usual date. It is a bird worth special study, for it has four distinct cries, two of them—I might almost write three—

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only known to few workers. Sir Charles Anderson records a young Cuckoo shot in Lea in October. I have only known them late in September, and I have given this species especial study.

Barn Owl.—Is common or only fairly common according as it is persecuted. It nests with us each season. There are numbers in Cadney Church. Mr. Young says, 'Rather local, and not common about Claxby.' I have examined numbers of pellets of this species, and have never known it to take game, though rabbits that can just run are sometimes taken, but very rarely. This seems only to be the case when they abound near villages, and close to stackyards.

Long-eared Owl.—This is thinly but widely scattered all over the district. On 4th of March 1889, I found a half-eaten viper in a nest in Cole's Plantation. I had no idea vipers were about at that time of year, even in the mildest weather. This bird will very rarely take young pheasants from their roosting trees, for it has been shot in the act; but I have never seen any signs of game, except young rabbits, in its castings.

Short-eared Owl.—This is our Woodcock Owl. It used to breed on our commons. The only time I ever found it, the nest was in rough grass in the open part of Cole's Plantation. The notes I have received on this species are not of the least value. It is common enough on migration in the autumn months, in rough grass and root crops. There was a 'flock' at Nettleton, 14th of December 1898. The Vicar and I had once six on the wing together on Cadney Beck Bank in November 1896. We judged—for moving on in front of us, as they frequently did, it was impossible to say for certain—there were between thirty and forty birds in this 'flock.' A passing flight of rooks mobbed one of the birds when on the wing, and chased it out of sight into Hibaldstow parish. It is said to have bred not so long ago on Scotton Common, and in Holton and Nettleton on moory ground. I have no exact information.

Tawny Owl.—This, along with the Long-eared Owl, is called the Brown Owl, much to the confusion of the notes received from my friends. I have no doubt it is the commonest owl in North-west Lindsey. It is certainly the largest and most powerful, and I believe it is the species most frequently given to taking game birds. It is a personal depravity, not a racial characteristic, most certainly. I do not think we have many small woods without it, as it is a most adaptable species in regard to nesting sites. At Messingham Water-mill, when the fish were coming up the beck in the spring, a pair that had their nest in a few Scotch Pines close by, took dace regularly from the ' backwater ' and ' slack ' when the mill was not running. The water at times was perfectly congested with fish unable to ascend higher on account of the dams. I have watched them taking the fish in the gloaming, and found the bones of dace, gudgeon, and ' pickerel ' or small jack in their castings.

(*To be continued*).

COLEOPTERA NEW TO YORKSHIRE.

T. STAINFORTH,
Hull.

***Pogonus chalceus* Marsh.**—On May 27th and June 11th I found this beetle occurring in some numbers at Saltend Common, on the Humber shore, about three miles east of Hull. The specimens were obtained by loosening the cracks in the low clay cliffs (from two to three feet in height) which are situated just above ordinary high-water mark on the banks of the tidal creek which forms the eastern boundary of the common. The time of day on each occasion on which I observed it was towards sunset, but it is probable that the species will be found to occur plentifully during the sunny periods of the day, on the edge of the mud left by the receding tide. Dr. Wallace, of Grimsby, obtains the species commonly on the Lincolnshire side of the Humber, and I have little doubt that it will be found at other places along the estuary if the right localities are searched at the right time. Many of the typical saltmarsh species such as the *Pogoni* appear fairly regular in their period of maximum abundance. In the same cracks as the *Pogonus* were found large numbers of immature *Dichirotrichus pubescens*, evidently just emerged from the pupal state, which in a few weeks' time will be found under every stone and clod on the Humber shore, in company with the ubiquitous sand-hoppers.

***Donacia braccata* Scop. (*nigra*, F.).**—On June 12th I found this fine species occurring in profusion on the *Phragmites commune* growing in a brackish ditch parallel to, and on the inner side of the embankment on the Humber shore, about two miles east of Hull. The specimens were first obtained towards sunset, by a chance sweep with a net among the *Phragmites*, and on search being made were found concealed, usually in pairs, in the axils of the reeds. I have not yet had the opportunity of observing their habits in sunlight. The ditch referred to is about half-a-mile long. The *Donacia* was found to occur only in a portion about twenty yards long, and neither sweeping nor searching produced a specimen elsewhere in the ditch. This portion, unfortunately, is close to the new dock which is being constructed near Marfleet, and is in imminent danger of being covered with nine or ten feet of clay, a fate which has already befallen a good length of the same ditch. I took the precaution of taking about a hundred specimens out of the danger quarter to a suitable situation further up the river, in the hope that they will establish themselves on the *Phragmites* there. The fact that this ditch has been swept and examined in different portions during past years with no result, shows the necessity for careful and extensive search, especially for species, which like the present instance, are limited in the times of their appearance, and extremely local. The localities for *braccata* given in Fowler's 'Coleoptera of the British Isles,' all occur in the south of England.

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Transactions of the Hull Scientific and Field Naturalists' Club. Vol. IV., part 1. A. Brown & Sons, 2/-

The contents of this recently published part are of a very varied character, some of them almost novel in a local scientific publication, and all of them going to form a collection of permanently valuable material for the student of natural history and anthropology. The first item is a capital article on the Roman, Angle, and Dane in East Yorkshire, by Mr. Sheppard. It is a sequel to former articles on 'The Making of East Yorkshire' and 'Pre-historic Man in East Yorkshire' by the same author, which have appeared in previous issues of the Transactions. These articles embody an amount of compressed information previously inaccessible in a collected form, and provide a synopsis of the physical and social history of East Yorkshire from the earliest times to the Conquest. This is an admirable article, and we trust Mr. Sheppard will continue the series, at least, until the close of the Tudor period. Mr. Sheppard also contributes a tasteful 'in memoriam' notice of the late J. R. Boyle, illustrated by a portrait, and supplemented by a sonnet from the Hull poet, Mr. E. Lamplough. There is a short note on the occurrence of perch in the river Hull, the value of which—the note, not the river—is in inverse ratio to its size. We hope to see in some future part an attempt made to account for the remarkable fact which Mr. Foster has placed on record. It is a pleasant surprise to find in this part a list of the Collembola and Thysanura occurring in the Hull district, and a list of East Yorkshire Arachnida. The club is to be congratulated on the inclusion amongst its members of two students of these little-known and less-studied groups. Finally, to add to the variety and provide the lighter side, there is a reproduction of the menu card of the club's first annual dinner. This is a piece of work well worthy of preservation. The caricature of the President as a prehistoric man is most amusing, and so also is the table of strata which, we doubt not, was investigated with gusto by non-geologists equally with geologists. No better proof of the vitality of the club could be furnished than this record of its work, now presented to the scientific world.—E. G. B.

AN EXCURSION TO TOPCLIFFE, YORKS.

THE members of the Yorkshire Naturalists' Union held their first excursion for the year in the vicinity of Brafferton and Topcliffe. There was a very representative gathering of Yorkshire Naturalists, the botanists being particularly well represented. The mycologists spent the week-end in the district, and were consequently able to more thoroughly explore the neighbourhood than were their colleagues in other sections, who had a short day only.

Some of the members, fortunate in securing the use of a motor car, visited the more outlying geological sections, and also examined some remarkable earthworks near the river at Topcliffe. There is an excellent section in a morainic mound, exposed in a gravel pit close by. This yielded a fair percentage of boulders of Carboniferous limestone, sand-stones and cherts. In the floor of the pit was a large boulder of Lake District andesite.

One of the questions which the geologists hoped to settle was the precise boundary of the Liassic shales. Unfortunately, the only sections occur in the river bed, and as the waters were swollen with the recent rains, there was no opportunity of deciding the matter.

By the kindness of the schoolmaster, the meetings were held in the schoolroom, the train service enabling the members to take their time over what is often a hurried item in the programme. Dr. W. G. Smith occupied the chair, and there were some very interesting reports presented by the representatives of the various sections.

There were thirteen new members elected, and three societies were affiliated with the Union. As usual, the land-owners gave every facility to the members, and the party was particularly indebted to Mr. Maynard for his personal help and guidance.

Before concluding the meeting, reference was made to Dr. W. G. Smith's removal to Edinburgh, and the loss which the Union and the county would consequently sustain. The members conveyed their best wishes to Dr. Smith in his new duties.

The following reports on the work accomplished have since been received:—

ENTOMOLOGY.—Mr. M. L. Thompson writes that the district was investigated so far as time would permit by Messrs. W. Denison Roebuck, W. Hewett, and himself. The most interesting insects were the single specimens of the local *Homalota angustula*, and the rare *Megacronus cingulatus*, taken among the pieces of bark and chips from felled trees in Leckby Carr. The first-named species does not seem to have been previously found in Yorkshire.

In Leckby Carr :—

Notiophilus palustris Duft.
Pterostichus diligens Sturm.
Anchomenus fuliginosus F.
Homalota angustula Gyll.
Homalota fungi Grav.
Tachyporus obtusus L.
Tachyporus brunneus F.
Megacronus cingulatus Mann.
Mycetoporus lepidus Grav.
Philonthus fimetarius Grav.
Xantholinus linearis Ol.
Mysia oblongoguttata L.
Anatis ocellata L.
Coccinella 10-punctata L.
Halyzia 14-guttata L.
Scymnus suturalis Thun.
Elater balteatus L.
Haltica ericeti Al.
Deporaus betulæ L.
Polydrusus cervinus L.

At Cundall :—

Necrophorus ruspator Er.
Silpha atrata L.
Coccinella 7-punctata L.
Chrysomela staphylea L.
Chrysomela polita L.

At Ellingthorpe Ings :—

Agabus nebulosus Forst.
Ilybius fuliginosus F.

At Brafferton :—

Carabus monilis F.
Pterostichus madidus F.
Necrophorus mortuorum F.

VERTEBRATE ZOOLOGY.—Mr. R. Fortune writes :—The day was devoted to working the lanes between Brafferton and Baldersby Park, a portion being devoted to Leckby Carr and Baldersby Park. A fine herd of Fallow Deer in the park came in for a great amount of attention, especially from the photographers of the party. The fine old trees were occupied by a flourishing colony of Jackdaws, most of the nests containing young. It was interesting to find the Tree Sparrow here, and the Green Woodpecker was seen and heard both here and at Leckby Carr. In the latter place a Magpie's nest was found, and in a neighbouring tree top a Jackdaw was found occupying the old nest of the Magpie. A huge nest of the Carrion Crow had recently been destroyed, and a great mass of sticks composing the nest, and the broken eggs, were seen under the tree.

The most noticable feature of the day was the great abundance of the Common Whitethroat, which appeared to be everywhere. Garden Warblers, too, were very plentiful, as was also the Black Cap Warbler. Owing to the inclement weather experienced this spring, the majority of the summer birds had only just arrived, consequently very few of their nests were found. The Corn Bunting was heard, but strange to say, neither the Whinchat nor Yellow Wagtail were seen, though the country is very suitable; probably they would turn up later.

The wet weather has been the cause of many floods in the river, the waters reaching to the newly-excavated holes of the Sand Martin, and in one was found a drowned bird which had been surprised in its nest by the rising waters.

Altogether forty-eight species of birds were seen. There are only four additions to the list of species seen during the 1891 excursion, viz., Kestrel, Corn Bunting, Reed Bunting, and Common Sandpiper. In Mammalia there is nothing of special interest to report; seven species were observed, of which four, the Fallow Deer, Otter, Fox, and Short-tailed Field Vole are additions to the 1891 list. Of Reptiles and Amphibians, two additions are recorded, Frog and Smooth Newt. Owing to the flooded state of the river, it was nearly impossible to see any fishes, and only three species were noted.

Mosses and Hepatics.—Mr. W. Ingham, B.A. writes:—An unusual number of bryologists attended this meeting, and good work was done. Mr. Barnes, the original discoverer of the rare Hepatic *Cephalozia fluitans* in 1891 on Leckby Carr, found it again at this excursion. He also added the rare and interesting moss, *Plagiothecium latebricola*.

The Hepatic *Cephalozia connivens* was also found. Numerous Sphagna or Bog Mosses grow on the Carr, but they have not such a plentiful supply of water as they had in past years, and are consequently of shorter growth. The rarest Sphagna are *S. medium* var. *roseo-pallescens* and *S. rubellum* var. *pallescens* The Sphagnum most plentiful was *S. recurvum* v. *mucronatum*, which was spread all over the Carr. One of the commonest Yorkshire bog-mosses, *S. cymbifolium* var. *glaucescens* competes with the last mentioned for the possession of the wet places.

The dominant moss of the Carr is *Tetraphis pellucida*, which fruits freely here at its proper season. *Aulacomnium palustre* is largely mixed with the Sphagna, and when the Agent pointed out blocks of peat that had been dug up, I was able to determine the stems of this moss in a semi-fossil state mixed with the Sphagnum remains. This mixture renders the peat impure. *Hypnum stramineum* and *H. fluitans* var. *Jeanbernati* were found along one side of the Carr. Mr. C. A.

Cheetham found some interesting mosses viz., *Tortula subulata* var. *subinermis*, *T. mutica*, *Plagiothecium silvaticum* and *Amblystegium fluviatile* all by the Swale, also *Hypnum aduncum* var. *paternum* in a clay-pit at Helperby.

Mr. C. Crossland writes :—The mycologists did not arrive in time to join the main party, but this mattered little; we should soon have been left far behind, as we were bent on a leisurely investigation of the mycological floras of the places we visited. Six was our number. After finding lodgings for the week-end, we, as a beginning, looked through the old garden at the back of the house while lunch was being prepared. Nine or ten species rewarded our short search, two being parasitic on last year's 'shoots' of the gooseberry bushes; their presence appeared to check the free development of some of the buds at the internodes, but not the terminal one. The American gooseberry mildew was carefully looked for, but not found. The afternoon was spent in Brafferton Wood, said to cover an area of 350 acres. The portion we looked over exhibited little signs of its being a good fungus wood, being rather dry and open, and devoid of fallen branches and decaying trunks. The agent, who accompanied us, however, said that plenty of toadstools of all sorts came up in September and October. There was a profusion of *Anemone nemorosa*, and numerous plants of *Paris quadrifolia*. Being too early for the Agaric crop, our attention was directed to 'smaller fry.' We found a little fungus paradise in a moist field corner between Brafferton Wood and the village. This consisted of a small heap of decaying twigs, year-old nettle stems, and the remains of a fine old Scotch thistle. Upwards of a dozen kinds were found, no fewer than nine of which were living on the old thistle, four of these being beautiful black moulds. The necessary apparatus for working out micro-species having been provided, a few hours' work was put in after the general meeting was over. The members who went to Leckby Carr and other places brought several interesting species, including *Morchella esculenta*, which they reported as being plentiful.

On the following day Myton was visited. On the way a fir plantation was looked through, and *Collybia tenacella* picked up among the fallen cones and needles A good crop of *Sclerotinia sclerotiorum* was found in a nettle bed near Myton Grange. At Myton, a huge *Polyporus sulphureus* was cut down from a white poplar; the tree, so far, does not appear to have suffered much from its elephantine sulphur-coloured parasite, but, no doubt, it eventually will.

The apple trees in one of the gardens were badly infected with the apple-tree canker—*Nectria ditissima.* Several sickly old trees were looked over, and this parasitic fungus was seen to be at work, persistently sapping the remaining bit of life out of them, while each year's crop of conidia and spores was left free to spread the disease to healthy trees. This was pointed out to the owner. When will people learn to make some attempt to stop the spread of economic plant diseases? The currant bushes in the same garden were badly affected with the bud-mite. The grubbing up and burning of the bushes, and the liming of the ground for a season or two was suggested as a remedy. The only response was a doubting shake of the head.

A curious phenomenon was noticed in the Post Office garden—a gooseberry bush growing out of an old apple tree, four feet from the ground. Possibly a gooseberry seed had been dropped in the axil of the forked trunk; there germinated, and the developing root found its way down the decayed interior of the trunk, and thus reached the ground.

So far as collecting was concerned, the results were most satisfactory, considering the time of year. Of the 107 species collected, 25 are new to the north-west division of the county, and one—*Rhaphidospora ulnaspora*—new to Yorkshire.

L. C. = Leckby Carr; B. W. = Brafferton Wood; B. = Brafferton; M. G. = Myton Grange; M. = Myton. The following is the list of species collected:—

Ithyphallus impudicus. On the ground, L. C.

Armillaria mellea. Mycelium within the bark of a decaying stump, B. W.

Collybia tenacella. Among dead cones and leaves in fir wood, M. G.

Mycena metata. Among dead twigs in neglected garden, B.

M. debilis.

M. tenerima. Among twig debris in neglected garden, B.

Omphalia umbellifera. On heathy ground, L. C.

Pluteus phlebophorus.

Entoloma sericeum. In pasture, M.

Nolanea pascua. In pasture, B.; M.

Galera tenera. In pasture, B.

G. hypnorum. Among moss, B.

Bolbitius titubans. Among grass, road side, M.

Stropharia stercoraria.

S. semiglobata. Both on cow dung in pasture, M.

Hypholoma sublateritium, M.

H. epixanthum, M.

H. fasciculare. B. W.

All on decaying stumps.

H. Candolleanum. On the ground among grass, hedge side, B.

Panæolus campanulatus. In pasture B.

P. fimicola. On dung in pasture.

Anellaria separata. On dung hill, B.

Psilocybe foenisecii. In pasture, M.; B.

Psathyra semivestita. In shady place on moist soil, road side, B.

Psathyrella gracilis.

P. atomata.
Both roadside among grass, B.

Coprinus comatus. Among short grass, road side, B.

C. niveus. On dung hill, B.

C. micaceus. On decaying stump.

C. Gibbsii.

C. radiatus. On dung in pasture, B.

Marasmius oreades. In rings in pasture, L. C.

Polyporus sulphureus. On white poplar, M.

P. squamosus.

Polystictus versicolor. B.

Fomes resupinatus. On dead branches, B.

Poria vaporaria. On dead wood, B. W.

P. blepharistoma. On rotting leaves, etc., B. W.

Hydnum ochraceum. On decaying pine wood, M. G.

Grandinia granulosa. On dead wood B. W.

Stereum hirsutum. Common on dead wood.

Hirneola auricola-judæ. On living elder trees, L. C.

Exidia glandulosa. On dead oak branch, B. W.

Tremella mesenterica. On dead branches, B. W.

Dacryomyces stillatus. Common on rotting wood.

Coleosporium sonchi. On leaves of colt's foot.

Uromyces poæ.

Æcidiospores on *Ranunculus repens*, B. ; M.

U. ficariæ. On *R. ficaria*, B.

Puccinia suaveolens. On *Carduus arvensis.*

P. hieracii.

P. fusca. On *Anemone nemorosa*, B. W.

Cæoma mercurialis. On *Mercurialis perennis.*

Hypocrea rufa. On rotting wood, B. ; M.

Nectria cinnabarina. On beech twigs, B.

N. ditissima. On branches of living apple trees. M.

Dialonectria sanguinea. On dead decorticated branch, B. W.

Xylaria hypoxylon. On stumps, B. ; M.

Daldinia concentrica. On fallen ash trunk, B.

Eutypa lata. On dead branches, B.

Byssosphæria aquila. On dead wood in neglected garden, B.

Cryptosphæria millepunctata. On dead ash branches, B.

Metasphæria complanata. On dead herbaceous stems. M.

Rhaphidospora rubella. On dead nettle stems, M. G.

R. ulnaspora. On dead nettle, B.

R. acuminata. On dead thistle, B.

Heptameria doliolum.

H. acuta.
Both on dead nettle stems, B.

Pleospora herbarum. On dead thistle, B.

Podosphæra oxyachanthæ. Early stage on hawthorn, M.

Morchella esculenta. Among grass, road side, L. C.

Dasyscypha virginea. On dead herbaceous stems, B.

D. nivea. On dead wood, B.

D. hyalina. On dead wood. M.

D. calycina. On dead larch twig, B.

D. Grevillei. On dead thistle, B.

Erinella Nylanderi. On dead nettle stem, M. G.

Chlorosplenium æruginosum. Mycelium on dead ash branch, B. W.

Sclerotinia sclerotiorum. On the ground in nettle bed, M. G.

Belonidium pruinosum. On effused pyrenomycete on dead wood, B.

Mollisia melalenca. On dead wood, B. W.

M. cinerea. On dead wood, B.; M. G.

M. atrata. On decaying thistle.

Ascobolus furfuraceus. On manure heap, B.

Orbilia lencostigma.

Var. *xanthostigma.* On rotting wood, B. W.

Pilobolus crystallinus. On horse dung, B.

Mucor mucedo. On rabbit dung, B. W.

Cystopus candidus. On shepherd's purse, B.

Plasmopara pygmea. On living leaves of *Anemone nemorosa,* B. W.

Peronospora parasitica. On *Alliaria officinalis,* M.

Synchytrium mercurialis. On *Mercurialis perennis,* B. W.

Cephalosporium acremonium. On dead herbaceous stems.

Botrytis vulgaris. Type on old chestnut husks, M.

Var. *sclerotiorum.* On decaying herbaceous stems.

B. cinerea. On decaying stems, B.

Ovularia obliquæ. On living leaves of *Rumex obtusifolius,* B. W.

Torula herbarum. On decaying herbaceous stems. B.; M. G.

Torula expansa. On decaying nettle, B.

Cladosporium herbarum. On decaying herbaceous stems, including thistle, B.

Helminthosporium rhopaloides. On dead thistle, B.

Dendryphium comosum. On dead thistle, B.

Ægerita candida. On dead wood, B.

Volutella ciliata. On decaying cow hoofs laid in garden corner, B.

Reticularia lycoperdon. On decaying stump.

Perichæna corticalis. On dead trunk, B.

Lycogala epidendron. On decaying trunk, B.

Arcyria incarnata. On rotting wood, L. C.

Trichia fragilis. On bark laid on the ground, M. G.

Chondrioderma difforme. On decaying thistle, B.

T. S.

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CORRESPONDENCE.—Spiders with changeable eyes.

Sir,—The other day while I was listening to the band in the Victoria Park, Colombo, *another species* of altis spider appeared on the bench where I was seated, and proved to be one with changeable eyes.* It was safely bagged, and I have been able to put it into a small test-tube, and see, under a pretty strong lens, exactly the mechanism by which the colour of the eye is changed (in this case from black to russet red). It is so simple that one is surprised that arachnologists should have been so led astray, as to fancy it might depend upon the play of light. The eyes of the spider consist of transparent chitin (?), and behind this is a globe, or possibly a disc. I am practically certain that it is a globe, half the globe is russet red, the other half is black, and the spider has the faculty of revolving it. Sometimes it revolves one eye, and changes its colour, sometimes only the other, sometimes both. And that is all!—Yours etc., —W. W. Strickland, Colombo, Ceylon.

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* For previous note see the 'Naturalist,' 1907, pp. 147-8.

SOME NEW NATURE BOOKS.

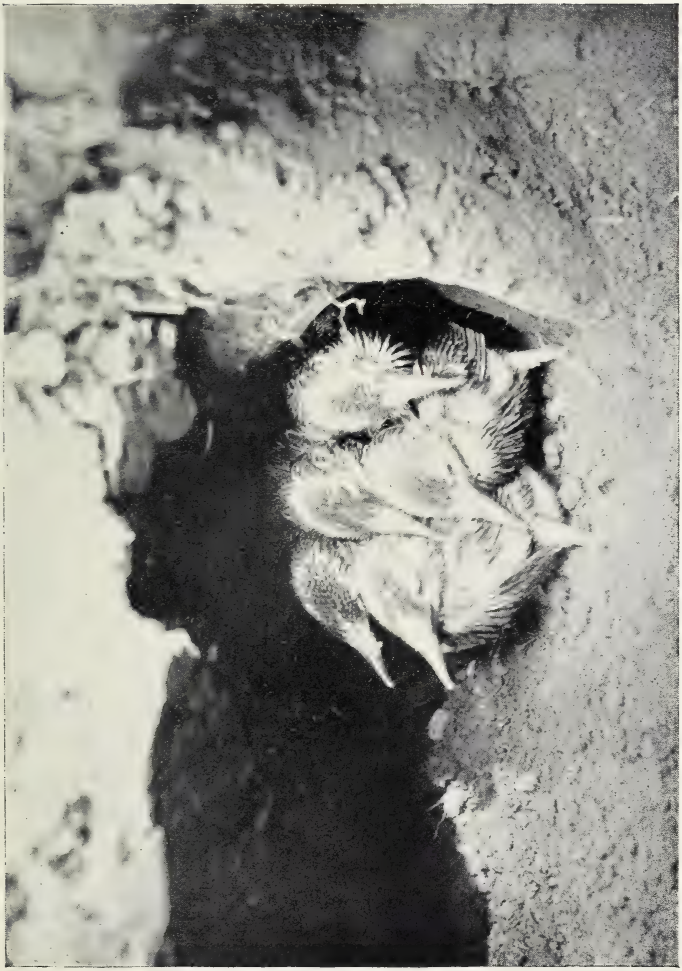
The number of books dealing with Nature Study, now being turned out by various and numerous publishers, is surely a sign of the increased interest being taken in natural science. Most of the scores of volumes that have appeared during the past twelve months have been specially prepared for children ; and as this class of book still appears on the market, it is fair to assume there is a demand for it, and that a few years hence there will be a grand crop of field naturalists !

Messrs. Everett & Co. have published **English Bird Life,** by **H. Knight Horsfield, M.B.O.U.** (466 pp., 7/6 net) which contains a veritable picture gallery of birds, mostly young ones. The photographs are largely the work of Mr. T. A. Metcalfe, and are alike a credit to the photographer and the printer, who has produced them in a way that is all that can be desired. Mr. Horsfield has a pleasant style, and draws attention to the more interesting facts relating to the various species with which he deals. His information is also reliable. We cannot say that ' English Bird Life ' contains very much more than is to be found in other recently published volumes dealing with the same subject, but it is illustrated in an exceptionally lavish manner. One of the illustrations the publishers kindly allow us to reproduce (Plate XXVII.).

The Open Air, by **Richard Jefferies,** will need little recommendation to readers of this journal. It is a book that can be read over and over again, and each time with profit. Messrs. Chatto & Windus have just issued a very excellent edition (234 pp., 5/- net), which is illustrated by Ruth Dollman, whose pictures have the same freshness that is to be found in Richard Jefferies' writings. If we might make a criticism, it is that there is just a little monotony in the golden yellows of the sketches ; a little variety would have been welcome, such as occurs in the coloured end-papers, which are quite refreshing after a perusal of the sketches on the plates. Possibly the latter have lost some of their charm by the process of reproduction.

In ' **Animal Life**,' by **Dr. F. W. Gamble, F.R.S.** (Smith, Elder & Co., 305 pp., 6]- net), we have a substantial and thoroughly scientific treatise, of a very different stamp from many books having a similar name (the present being by no means the first volume bearing this identical title). Dr. Gamble's work as Lecturer on Zoology at Owen's College, Manchester, is widely known, and he has been well advised to place these numerous and varied essays in permanent form. It is also pleasant to find to what a large extent the Manchester Museum has been able to supply him with excellent examples for illustration—no matter on what branch of natural history he writes. The book is arranged on original lines, the chapters dealing with the Interest of Animal Life, the Fulness of the Earth, the Organisation of Animal Life, Movement, the Quest for Food, the Breath of Life, the Senses of Animals, the Colour of Animals, the Welfare of the Race, and the Life Histories of Insects. To those interested in teaching, we can particularly recommend this book, but those who revel in blithering twaddle should leave it alone ; they will not find any here.

The Insect Book, by **W. Percival Westell,** John Lane, 120 pp., 3/-. We have less to complain about in this volume than we have in the generality of Mr. Westell's works, which, by the way, are being turned out with appalling frequency. For one thing ' The Insect Book ' is a small one. As in previous cases the author has been successful in securing a fine collection of photographs—in this instance Mr. R. B. Imission supplying the usually very fine illustrations, which form the foundations upon which the book is built. Mr. Westell has endeavoured to give an interesting account of the various forms of insect life, and to a large extent he has succeeded. Here and there, however, slips occur, which shew that he is not quite so much at home amongst the beetles and grasshoppers as he is amongst the balloons and birds, particularly when he is addressing his little



Kingfishers twelve days old.

BRITISH MUSEUM NATURAL HISTORY

nephew. The present volume has followed Mr. Westell's larger 'Story of Insect Life,' which was not sent to us, so we cannot compare the two. Judging from the experience gained from seeing previous volumes, however, we should imagine that the present is a 'boiled down' edition of its predecessor, and we hope in the process that much of the irritating talky-talky nonsense has been omitted, though apparently all of it has not. We were going to refer to the style of the writing in the present volume, but we find from the author's preface that it is modestly described as 'bright, crisp, and entertaining,' so we will take his word for it, though many wouldn't.

The Farm shown to the Children, by **F. M. B.** and **A. H. Blaikie,** described by Foster Meadow. Edinburgh, T. C. and E. C. Jack, 91 pp., price 1/-. This is a further addition to Messrs. Jack's well-known 'Shewn to the Children' series, and has all the merits of the volumes previously noticed in these columns. From the knowledge possessed by the author, it is evident that his selection to describe the beautiful pictures is as appropriate as is his name. The Farm is dealt with very cleverly, from almost every aspect, and in a way delightful to young folks.

Gleanings from the Fields of Nature, by **E. T. Connold, F.Z.S.** Religious Tract Society, 270 pp., price 3/6 net. Like so many of the publications from this firm, Mr. Connold's book is a remarkably cheap production. It consists of a series of essays dealing with spiders, sea-urchins, ants, whelks, wasps, fungi, etc., etc., bound together. There are several illustrations from photographs, mostly of specimens secured in the Hastings district, now in the author's 'private museum.' There is what the author calls an 'excellent introduction' to the volume from the pen of Dr. David Anderson-Berry, in which that writer says nice things about Mr. Connold; most of it, however, is rather too much like a sermon. To young readers particularly 'Gleanings from the Fields of Nature' will appeal.

Nature Study Made Easy, by **E. B. Shallow** and **W. T. Cullen.** The MacMillan Company, New York, 136 pp., 2/-. This is evidently intended as a reading book for young children, and begins with 'Oh, Mary, what a beautiful flower, cried little Nellie Brown.' Nellie then asks if it has any perfume, and in this way gets some information about a rose, which reminds her of the lily, and later of a poem 'the Lily and the Rose,' which is given, and so on. The book is written in fairly simple language, and is profusely illustrated. As in the case of so many 'Nature Study' books, it is confined to plants.

Nature Study and Brush Drawing, correlated on Heuristic lines, by **W. F. Rankine.** Cassell & Co. 64 pp. This is really an excellent book of its kind. the numerous carefully drawn illustrations of animal and plant life being in white on a black back-ground, suitable for reproducing on the blackboard. The descriptions given with each are well thought out, and will prove most serviceable to teachers. At the end of the volume are notes on collecting and preserving specimens, observations and records, and a 'Nature Calendar.'

The World's Birds, by **Frank Finn.** London: Hutchinson & Co., 180 pp., price 5/- net.

This book was originally started as a joint production of Dr. Chalmers Mitchell and Mr. Finn, but the appointment of the former as Secretary of the Zoological Society prevented the joint production of the work, but nevertheless, the author has carried out the task well, single-handed The volume contains a useful summary of the chief families, the descriptions being supplemented by several excellent diagrams in the text, and by numerous plates from photographs of birds in the 'Zoo.' The matter is necessarily 'boiled down,' but is rendered perfectly intelligible and handy by being placed under the heads of 'Diagnosis, size, form, plumage and colouration, young, nest, eggs, incubation, courtship, food, gait, flight, disposition and habits, note, economic qualities, captivity, and distribution of important species.'

FIELD NOTES.

MOLLUSCA.

***Helix nemoralis* monst. *sinistrorsum* in Lincs.**—A few days ago Mr. Beetlestone, of Market Rasen, kindly submitted for my inspection a very nice adult specimen of *Helix nemoralis* monst. *sinistrorsum* var. *rubella* 00300, which he found on the railway embankment, Market Rasen, in June 1907.—C. S. CARTER, Louth.

—:o:—

FLOWERING PLANTS.

Water-Carried Species.—I find I have the following notes of *Arenaria verna* Linn. as a water-borne species. There can be little doubt they were carried by the river Ouse from West Yorkshire:—Riverside, Barton, 1847, Dr. Grantham. The same, 1892, Miss Firbank. These specimens are in the County Herbarium, Lincoln. Riverbank, near Hull, 1892, Miss Firbank. This specimen was sent to Mr. F. A. Lees in 1892 or 1893. It is no doubt in his herbarium.—E. ADRIAN WOODRUFFE-PEACOCK, Cadney, Brigg, 23rd May, 1908.

Bearberry in Yorkshire and Derbyshire.—As the Bearberry (*Arctostaphylos Uva-ursi* Spreng.) is a rare plant on the southern Pennines, it is perhaps worth while to state that, in the company of Mr. F. T. Brooks, I found this species in abundance in two S. Pennine localities last Easter. One of these is in S.W. Yorkshire, and the other in N. Derbyshire, and both are, I believe, unpublished localities. The Bearberry was growing in the company of ling, cowberry, crowberry, bilberry, *Nardus*, etc., on steep hill sides at an elevation of about 1,200 feet. In neither case did the Bearberry extend on to the plateau above. The Yorkshire locality was on Pendleside Grit, and the Derbyshire one on Kinder Scout Grit. —C. E. Moss, Cambridge.

—:o:—

ARACHNIDA.

A Pseudo-scorpion new to Yorkshire (*Chthonius tetrachelatus* Preys).—This evening, in Mr. Weaving's greenhouse, Bottoms Wood, Slaithwaite, I took four examples of *Chthonius tetrachelatus* Preys. from amongst leaf débris and loose boards. This pseudo-scorpion has not before been met with in, and is the seventh species of the order now on record for Yorkshire. It will probably, if looked for, be found in similar situations elsewhere in the county.—WM. FALCONER, Slaithwaite, June 15th, 1908.

BIRDS.

Brünnich's Guillemot *(Uria bruennichi)* at the Farne Islands in June.—On June 14th, when off the celebrated Pinnacle Rocks, with Mr. Riley Fortune, I was greatly surprised to notice a Brünnich's Guillemot on the water, and quite close to the boat. I called my friend's attention to it, and we watched it diving and reappearing for some time, and put the boat round to follow it until it was lost in the hundreds of Common Guillemots that were floating upon the surface. We hung about for some time longer, but could not find it again, and unfortunately were leaving for home the following morning.

A rather curious feature was that it was not in full summer plumage, and it was the fact of having more white upon its neck and lower throat in contrast to its companions, the Common Guillemots, that first drew my attention to it, and it was also rather darker on the upper parts. It was in a state intermediate between the winter and summer plumages. Supposing it were a winged bird would that retard its nuptial plumage, or does Brünnich's Guillemot attain its summer plumage later than its more common relative ?

But its thicker, slightly shorter, and differently shaped beak was quite distinct from that of the Common Guillemot, and on one occasion it rose so very near to our boat that I could distinctly see (through my field-glasses) the white line along the edge of the basal half of the upper mandible.

Immediately on our return ashore at Seahouses we re-examined the specimen of Brünnich's Guillemot at the Bamburgh Arms Hotel, which was shot off the Farne Islands by the late Mr. Cuthbertson. Our identification was confirmed, excepting that the stuffed bird was more in winter plumage than the bird we had seen. In my own mind I have not the slightest doubt about its correct identity. But I am aware that the accuracy of its occurrence in summer may be challenged, so I am sending this short note without delay in order that any ornithologists who visit the Farne Islands this season may look out for the bird.—HARRY B. BOOTH, Bradford.

◆

Some months ago Mr. Leonard Gill, the Curator of the Hancock Museum, Newcastle, contributed to the 'Newcastle Daily Chronicle' a series of articles dealing with the history of the Museum under his charge. These have been reprinted as an appendix to the 'Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne,' and form a very valuable record.

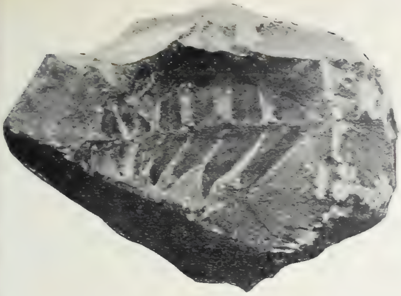
REVIEWS AND BOOK NOTICES.

We have received the Fifty-fifth Annual Report and Transactions for 1906-7 of the **Nottingham Naturalists Society,** issued April 18th, 1908. 73 pp.

It is a very valuable record. Mr. A. T. Metcalfe's presidential address on 'The Geology and Scenery of the Derbyshire Dales' is an excellent chapter in local geography and geology. Mr. A. R. Horwood, of the Leicester Museum, contributes an exhaustive list and bibliography in his 'Contribution to the Palæontology of the North Derbyshire and Notts. Coalfield.' This is illustrated by two very good plates of typical fossil plants from the Middle Coal-Measures of Derbyshire. Prof. J. W. Carr contributes 'The Herbarium Nottinghamiense of Thomas Jowett'—a collection of plants made nearly a century ago, and now cared for in Nottingham. Some of the species enumerated are not now represented in the county flora. There is also a page devoted to 'The Microscopical Section' of the Society. We are kindly permitted to reproduce the illustrations of the Derbyshire Coal-Measure fossils for the benefit of our readers (see Plate XXVIII.).

Mosses and Liverworts, by **T. H. Russel, F.L.S.** London: Sampson Low, Marston, pp. ix. and 200, eleven plates, one coloured. Price 4/6 net.

This book has been written by one who loves the mosses, and delights to chat about them. He tells pleasantly the life stories of the more common forms, has much of interest to say about their habitats, form and structure, in simple and clear language, which makes the book enjoyable reading. He avoids, where possible, technical terms, and when any are used, explains them clearly, aided by well-drawn figures on the plates, one of which we are permitted to reproduce, the explanation of which shows the author's use of the term 'Flower.' One or two points, however, call for criticism. Attempts to avoid technical terms are very liable to fail, and here we find the author describing the antheridia as 'fertilising flowers,' and saying that they 'correspond broadly with the stamens of an ordinary flower.' He fails to point out that these structures are not homologous, and belong to different generations in the life cycle. Similarly, archegonia are called 'fruit-bearing flowers,' and this leads to many crude statements *re* fertilisation of which the author does not seem very familar. Nothing is said about alternation of generations, and its significance in the life cycle of mosses, and he fails to indicate the true relationship between the 'fruit' and the leafy plant. These essential and elementary points ought not to be omitted in a book of this character. There is room for a chatty work on mosses, but in a future edition the author should clear up the ambiguities and mis-statements of the present one. We are permitted to reproduce one of the plates (Plate XXIX.), of which the following is the explanation:—1. First growth from Spore—*Chiloscyphus polyanthos;* 1a, Germ plant —*Pellia epiphylla;* 2. Flower-bud—*Jungermania sphærocarpa;* 3. Flower cup (Colesule)—*Frullania dilatata;* 4. Veil (Calyptra)—*Metzgeria furcata;* 5. Flower-cup and Fertilised Flower—*Radula Complanata;* 6. Flowers (Antheridia)—*Diplophyllum albicans;* 7. Flower (Archegonium)—*Diplophyllum albicans;* 8. Flowers (Archegonia, young) —*Diplophyllum albicans;* 9. Veil—*Frullania dilatata;* 10. Flower-cup and ripe Capsule—*Cephalozia bicuspidata;* 11. Flower-cup, ruptured Veil and Capsule—*Radula complanata;* 12. Capsules—*Lophocolea cuspidata;* 13. Gemmæ on leaf—*Jungermania sphærocarpa;* 14. Head of Gemmæ—*Jungermania sphærocarpa;* 15. Spores and Elaters—*Fossombronia cristata;* 16. Elaters—*Frullania germana;* 17. Elaters adhering to empty Capsule—*Frullania dilatata;* 18. Receptacle for Gemmæ on frondose plant—*Marchantia polymorpha;* 19. Gemmæ—*Marchantia polymorpha;* 20. (a) Antheridium of Liverwort (*Diplophyllum albicans*) and (b) of Moss (*Sphagnum cymbi- folium*).



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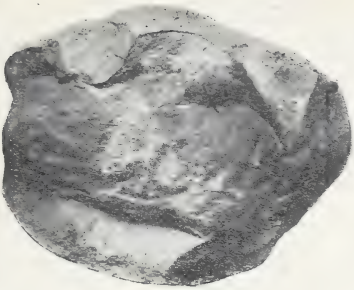

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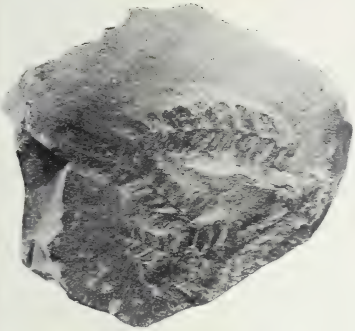

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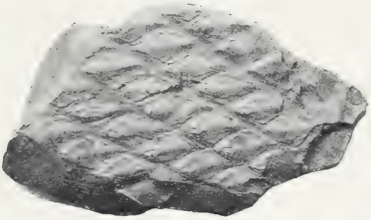

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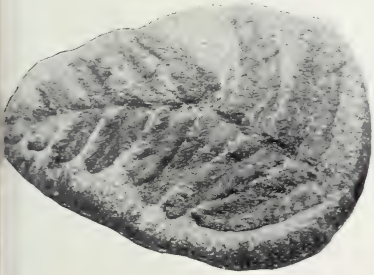

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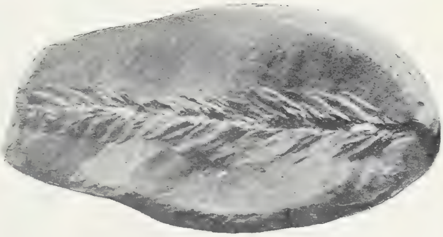

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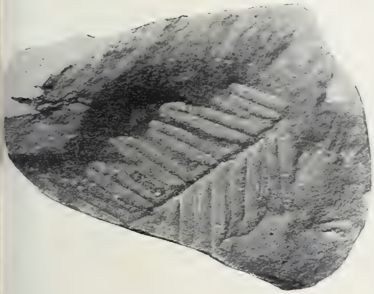

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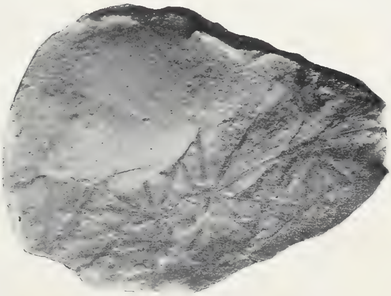

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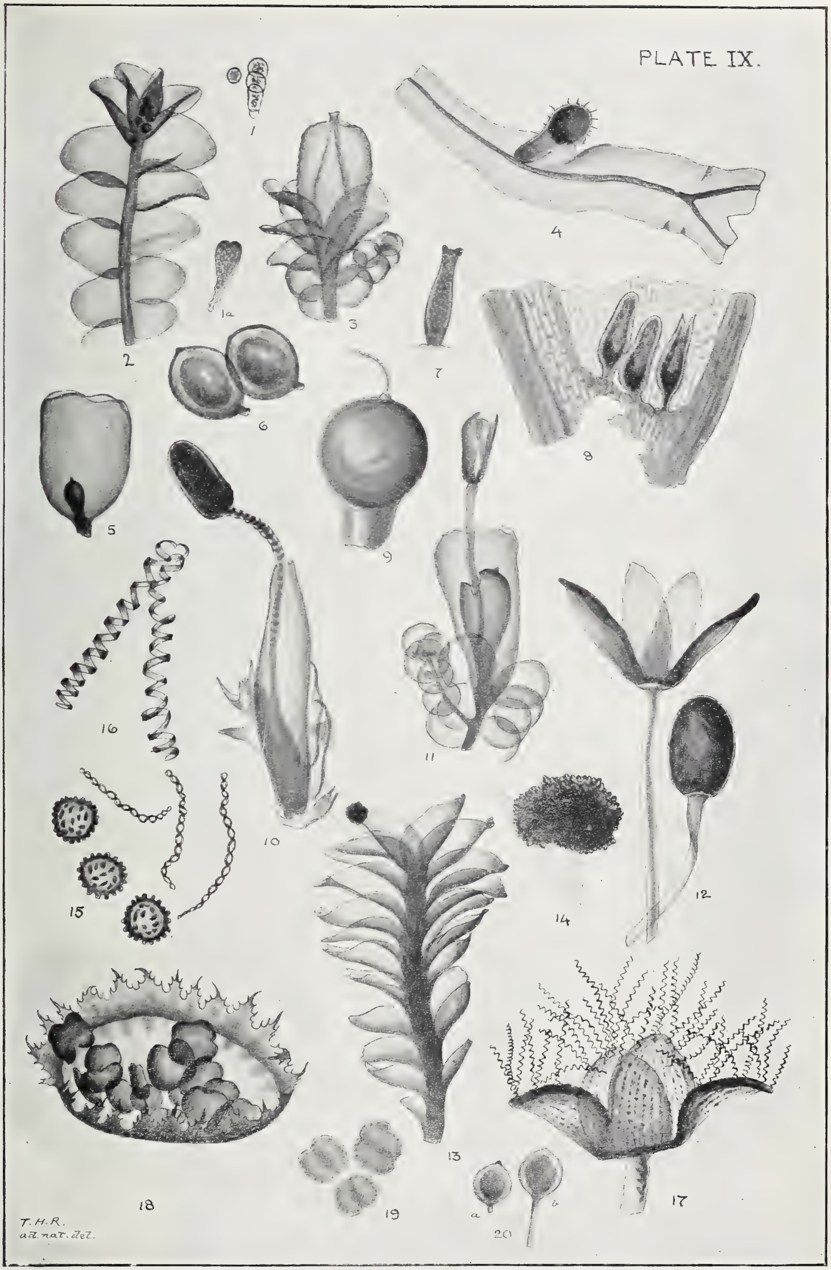
g. 1. *Alethopteris lonchitica* Schloth.
gs. 2 and 3. *Neuropteris heterophylla* Brongn.
g. 4. *N. impar* Weiss M.S.
g. 5. *Annularia radiata* Brongn.

Fig. 6. *Lepidodendron ophiurus* Brongn.
Fig. 7. *L. lycopodioides* Sternb.
Fig. 8. *Carpolithes wildii* Kidston.

Typical Derbyshire Coal-Measure Fossils.
(about half natural size).

BRITISH MUSEUM NATURAL HISTORY



Illustrations of various stages of Liverwort growth and structure, and special modes of reproduction.

BRITISH MUSEUM
NATURAL HISTORY

NORTHERN NEWS.

On April 30th Selby's new waterworks were opened by Mr. M. Scott. They have been constructed on Brayton Barff, on a site chosen by Professor Kendall and the late C. E. De Rance.

Mr. R. Kidston, F.R.S., well known for his researches upon the Carboniferous flora, has recently had the honorary degree of Doctor of Laws conferred upon him by the Glasgow University.

Prof. Redmayne, of the Birmingham University, who is a 'Tynesider,' and has had much experience in the north-east of England, has been offered the appointment of Chief Inspector of Mines.

On going to press we learn that a Civil List pension of £250 per annum has been granted to Sir Edwin Ray Lankester, K.C.B., the Director of the British Museum, (Natural History), in consideration of his eminent services to science.

We regret to learn that a young man has recently visited various naturalists at Barnsley, Halifax, and other places, endeavouring by various means to secure 'loans' of money. He has used the names of the editors of this journal, and of various Yorkshire naturalists. We should be glad if any of our readers who are approached, would at once communicate with the editors of this journal.

At the annual meeting of the Darlington and Teesdale Naturalists' Field Club held on April 28th, a large silver salver was presented to Mr George Best, who is leaving Darlington for Portsmouth. The salver was inscribed: 'Offered to Geo. Best to record the Darlington Field Club's appreciation of his seventeen years' labours as hon. secretary, in promoting the interests of the Club, and stimulating the study of natural science.'

Estate of the gross value of £45,643 has been left by Dr. H. C. Sorby, of Sheffield. He has left to the Literary and Philosophical Society certain printed books; to the University of Sheffield, such books as the Philosophical Society might not select, especially those on 'ancient Egyptian antiquities, early natural history, and Anglo-Saxon literature,' his optical and scientific instruments and apparatus, cases of geological and mineralogical specimens, his manuscript books and notes upon geological and other scientific subjects, etc. A total sum of £10,000 is left to the University of Sheffield for the endowment of a Professorship of Geology, or such other object as the University may think more suitable. To the Royal Society of London he left £15,000, the income of which is to be devoted to the establishment of a Fellowship or Professorship for the carrying on of original scientific research. His object, Dr. Sorby states in his will, is to promote the discovery of new facts rather than the teaching of what is known. He desires also to associate the discovery of new knowledge with the city of Sheffield, and directs that so long as in the opinion of the Council of the Royal Society, the proposed researches can be properly carried out in connection with the Sheffield University, and reasonable facilities are supplied, the Committee administering the fund shall consist of four representatives of the Council of the Royal Society, one of the Council, and two of the Senate of the University. Provision is also made for the payment and method of selection of the Fellow to fill the chair. The testator also bequeathed £500 to the York Diocesan Church Extension Association, towards building or enlarging churches in connection with the Church of England in Sheffield; £500 to the Literary and Philosophical Society; and £1,000 each to the Sheffield Royal Infirmary and the Geological Society of London.

Uncle Westell, in the 'Animal World' recently, has again been enumerating the various wonderful things he can see with his 'seeing eye,' whereas the ordinary mortal heeds them not. Mr. Westell may have the 'seeing eye'; but, he knows it.

'A remarkable discovery in the Tees' has gone the rounds of the daily papers, together with the usual speculations as to its origin. It has been submitted to us, and proves to be the tooth of an Indian elephant, which has probably dropped overboard from a cargo of bones.

Two new British beetles are described in the May 'Entomologist's Monthly Magazine'; one, *Litargus coloratus* Rosenh., was found last year in Sherwood Forest, by Mr. J. Ray Hardy; the other, *Longitarsus nigerrimus* Gyll. was taken near Cleethorpes, by Dr. W. Wallace, of Grimsby.

A weekly journal devoted to birds, squeaking shoes, and true stories has appropriately reproduced 'Punch's' cartoon, 'A Modern St. Francis,' in which Lord Avebury is surrounded by all manner of birds. We wonder if the editor had noticed that his lordship is significantly pointing to the Lyre-bird.

According to a recent report of the Parks' Committee of the Hull Corporation, the municipal peahen died, leaving the peacock 'looking lonely.' It was also reported that it had recently made friends with a black cat, and the two strolled up and down the green together, the cat even being occasionally found in the peacock's nest! It was decided to find a new and proper mate for the peacock.

We are glad to learn from the 'Agricultural Economist' that Warrington has now followed the example of almost every other town, and has 'one of the best-arranged museums in the country,' though the photographs which accompany the note, excellent as they are, hardly seem to add weight to this statement. The Museum has also 'inaugurated' a wild-flower table, and the suggestion is made that 'the idea is one well worth following by other similar institutions.' It is just possible, however, that our excellent friends at Warrington (who are not responsible for the note in the 'Agricultural Economist') have in this way followed the lead of many other similar institutions.

'To kill wasps:—Clap your hands smartly together so as to crush the insect between them as it flies. When thus killed it is quite unable to sting!'—'The Countryside.' To this 'Punch' adds:—'Though it is quite true that a dead wasp cannot sting, yet it should be noted that a dying wasp is sometimes so ungrateful as to spurn the hand that stroked it. Beginners, therefore, should avoid the 'south end' where the sting is, and clap the animal on the head.' Personally, we think that 'Punch' might stick to its own sphere, and not try to rob its contemporary of a reputation of being the only journal giving really useful and reliable natural history information.

In the early hours of Good Friday morning, the 'Barnsley' bed of coal, nine feet thick, was reached in a boring on Thorne Moor at a depth of 916 yards. According to the 'Yorkshire Post,' the borehole 'on Thorne Moor has proved the existence of minerals over a stretch of country from Bentley to Thorne, a distance of ten miles or more. Millions upon millions of tons of coal lie deep down, waiting for the getting, in the region of the new borehole, and the winning of that coal means the transformation of Thorne from a quiet country town, with a market in name only, into an industrial centre, which may approach in importance the neighbouring borough of Doncaster, now looked upon as the future hub of the South Yorkshire coalfield.' It is to be hoped that the proposed natural history survey of Thorne Moor will be completed before these changes take place!

BRITISH MUSEUM NAT. HIST. 4 JUL. 1908

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THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

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THE MUSEUM, HULL;
AND
T. W. WOODHEAD, Ph.D, .F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
J. GILBERT BAKER, F.R.S. F.L.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S.,
T. H. NELSON, M.B.O.U.,
GEO. T. PORRITT, F.L.S., F.E.S.,
JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.

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In the Catalogue which has been prepared the data given with regard to each specimen are the label-number, the date and place of capture, and the collector's name. In addition, **each varietal and aberrational form is briefly described,** and references are given to corresponding figures in Barrett's "Lepidoptera,' and the yearly volumes of the "Entomologist." By this means it is hoped to render this unique collection more widely known, and more useful to students in other parts of the country, as well as to those living in the remote corner of Holderness.

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NOTES AND COMMENTS.

DIAPOSEMATISM, OR RECIPROCAL MIMICRY.

In addition to the usual well-illustrated papers dealing with exotic butterflies, etc., the 'Transactions of the Entomological Society of London' for 1908 (part I.) contain a paper on 'Diaposematism, with reference to some limitations of the Müllerian Hypothesis of Mimicry,' by Mr. Guy A. K. Marshall. In this the author points out that 'one of the most striking features in connection with the philosophical study of the phenomena of mimicry among butterflies in recent years has been the marked tendency to lay an ever increasing emphasis upon the importance of the selective factors suggested by Fritz Müller, and to minimise the influence of what is known as Batesian mimicry. It has even been suggested that every known case of mimicry among butterflies can be more satisfactorily interpreted as being due to the operation of Müller's principle.'

TWO THEORIES OF MIMICRY.

'The essential difference between these two theories of mimicry lies in the fact that one explains how an edible (or less unpalatable) species will derive advantage through assuming a superficial likeness to another which possesses nauseous (or more unpalatable) qualities (Batesian mimicry); whereas the other shows how one nauseous species will benefit by mimicking another having the same qualities (Müllerian mimicry). Now although there can be little doubt that a good many cases of mimicry originally adduced in support of Bates' theory, must now be explained on Müllerian lines, yet the universal application of this latter principle to butterflies, involving as it does, the assumption of unpalatability in every mimic, seems open to some serious objections.' These objections are given in detail in this suggestive paper.

THE BEARDED TIT.

Mr. W. P. Pycraft has recently recorded* some interesting facts in connection with the nest and nestlings of the Bearded Tit. During the Whitsuntide holidays he found a nest of this species on the ground, almost five or six yards from the water. It contained six young, all more or less mangled, evidently the work of a mole—the runs of which occurred beneath the nest.

---

* British Birds, July 1908.

On pulling the nest to pieces he found that it was generally typical, leaves of the reed forming the outside, and the flower-heads thereof its lining. An unusual feature, however, was the number of feathers interwoven with the lining. Feathers of the swan, mallard, water-hen and snipe were detected.

PECULIAR MARKINGS.

Of particular interest were some peculiar markings inside the mouths of the nestlings. Briefly, these 'take the form of four rows of pearly-white, conical, peg-like projections, suggesting the palatal teeth of reptiles, two on either side of the middle line. These tooth-like bodies . . . were not of uniform size, and were set in a background of black, surrounded by a rich carnelian red, the whole being framed in by the lemon-yellow gape-wattles, which are not very strongly developed. The tongue is black with a white tip, and a pair of white spurs at its base.'

THE DARWIN CELEBRATIONS.

On July 1st there was a large and representative gathering of the members of the Linnean Society of London and their friends at the Institution of Civil Engineers, the occasion being to celebrate the 50th anniversary of the placing of the 'Darwinian theory' before the society by the late Charles Darwin and Dr. Alfred Russell Wallace. The president, Dr. Dukinfield H. Scott, in a brief address, welcomed the delegates from Universities, etc., and the guests. He said they had met to celebrate the greatest event in the history of their Society since its formation, and the presence that day of Dr. Wallace and Sir Joseph Hooker was in itself enough to ensure the success of the meeting. Medals representing Darwin and Wallace had been struck for presentation to Dr. Wallace, Sir Joseph Hooker, Professor E. Haeckel, Professor E. Strasburger, Professor A. Weismann, Dr. Francis Galton, and Sir E. Ray Lankester.

DR. A. RUSSELL WALLACE.

Dr. Wallace thanked the Society for the very great honour they had done him, and also for perpetuating his features together with those of his illustrious fellow-worker, Darwin. Since the death of Darwin, in 1882, it had been not infrequently stated in the Press that they made the discovery simultaneously, and some indeed went so far as to state that he (Dr. Wallace) was the first discoverer, and then gave way to Darwin. The real fact was that the idea occurred to them independently, and it was first announced to the Linnean Society fifty years ago. Darwin had written an outline of his view, and submitted it to some friends, but he refrained from going further, as being at the time not ready to put it before the Society. Dr. Wallace wrote to Darwin on the subject without having heard of the Darwin movement, and his letter came upon the latter as a thunderbolt. In the end, two papers on the subject were read before the Society. These being the facts it could not be said that he had given the idea to Darwin.

NEW NAMES FOR OLD ANIMALS.

We can sympathise with Mr. R. Lydekker, who makes the following observations in ‘ Knowledge ’ for July :—‘ For many years three well-known British bats, the pipistrelle, the great bat, and Leisler's bat, were almost universally designated respectively, *Vesperugo pippistrellus, V. noctula*, and *V. leiseri.* Some years ago we were, however, told that the name *Vesperugo* must give way to *Pipistrellus*, when the three species became respectively, *Pipistrellus pipistrellus* (according to the purists) *P. noctula* and *P. leisleri.* The next change was to remove the two latter species from *Pipistrellus*, which involved a further change of name to *Pterygistes noctula* and *Pt. leisleri.* Just as we are getting used to these names we are informed that the name *Pterygistes* is antedated by *Nyctalus*, and they are accordingly once more changed to *Nyctalus noctula* and *N. leisleri.* Something of the same kind has happened in the case of the long-tailed field-mouse, which, after being known for years as *Mus sylvestris*, was some time ago generically separated from the more typical mice as *Micromys sylvaticus.* After enjoying this title for a season, we are told again on the grounds of priority, that it must be known (till next time) as *Apodemus sylvestris.*’

PRIORITY *v.* USE.

‘That there will be a reaction against this constant changing (which involves a terrible and altogether unnecessary strain on the memory), I myself am fully convinced, and, perhaps, the best hope for the speedy appearance of this reaction is to be found in the ceaseless changes now proposed in nomenclature. When a really strong systematic naturalist makes his appearance, he will, I have little doubt, make short work of the innovations. Personally, I intend for the future to adopt few, if any, of them, and regret that I have accepted such changes in the past. Names that have been generally accepted for half a century or more, and have, in many instances become almost household words, should be allowed to remain. It is not as if they could be consigned to oblivion, as they must always survive in a number of standard works. We have, therefore, to remember at least two names where one would suffice, thereby at once doing away with the whole object of systematic nomenclature, which was primarily intended to assist the memory.'

UNRECORDED CEPHALOPODS FROM THE YORKSHIRE OOLITES.

HENRY CHARLES DRAKE, F.G.S.,
Hull.

During a recent stay in Scarborough, I was fortunate enough to obtain *in situ* from the Scarborough Limestone of Hundale Point, the greater portion of a large Ammonite. A boulder had evidently fallen upon it from the cliff above, and broken it, the broken portion having disappeared. The remaining part shews the inside whorls perfectly. This I sent to Mr. G. C. Crick, F.G.S., of the Natural History Museum, Kensington, who informs me that it is *Dorsetensia sub-tecta* Buckman, and a new record for the Scarborough Limestone.

Mr. Buckman gives the following description of this Ammonite in his Monograph on the Inferior Oolite Ammonites in the publications of the Palæontographical Society, 1891, page 309 :—

'Discoidal, compressed, hollow carinate. Whorls broad, much compressed, ornamented with arcuate, ventrally projecting ribs declining to striæ in the adult. Ventral area not defined, furnished with a very strong hollow carina. Inner margin well defined, upright. Umbilicus graduated, marked with obscure ribs.'

He gives three varieties :—

A.—Umbilicus rather open and ribbed, obscure ribs on the whorl retained for some time.

B.—Umbilicus smaller and less conspicuously ribbed ; the ribs on the whorl yielding to striæ at an early age.

C.—Like *B* but thinner, whorls flatter, umbilicus smaller, and without any trace of ribs.

This Ammonite occurs in the Humphresianum Zone of Oborne and Sherborne, Dorsetshire, but is decidedly scarce.

Mr. G. Sheppard has also found a piece of an Ammonite from the same locality, which may possibly be the same species. Both these specimens are in the Geological gallery of the Hull Museum.

Another Ammonite which I obtained from the Cornbrash of Scarborough is *Macrocephalites compressus* Blake ; a large specimen of which I sent to Mr. Crick, who informed me of the fact that they had not previously a specimen from the Yorkshire Cornbrash in the Natural History collection.

Professor Blake, although he worked in the Scarborough district, did not find *M. compressus*.

I also found a large *Nautilus* possibly *N. truncatus*, which, with another large specimen of *M. compressus*, is now in the Hull Museum. The former is 10″ × 12″, and the latter measures 6″ × 10″.

Two Ammonites I obtained from the Scarborough Limestone on the rocks nearly opposite to Holbeck gardens, Mr. Crick refers to *Normanites braikenridgii macer* Quenstedt, and quite distinct from Sowerby's *A. braikenridgii*. See Quenstedt 'Die Ammoniten des schwäbischen Jura,' Vol. II., 1886-7, plate 65, figs. 4, 5.

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The Bill 'to make further provision with respect to the University of Durham' has been printed.

Still they come, and go. The 'Lancashire Naturalist' has closed its career on the completion of its twelfth monthly issue.

Mr. Edwin Goldthorpe Bayford, of Barnsley, a prominent member of the Yorkshire Naturalists' Union, was recently elected a Fellow of the Entomological Society.

The Guildhall at Boston, a fifteenth century building, is likely to be rescued from its present object as a furniture store, and will probably be made into a museum, a liberal offer towards the establishment of a local museum having been made to the Boston Town Council.

Mr. J. W. Jackson, of the Manchester Museum, has favoured us with reprints of two valuable papers. The first is his useful 'Bibliography of the Non-marine Mollusca of Lancashire,' which appeared in the Journal of Conchology, and the second is from the June 'Geological Magazine,' and deals with a 'Mottled Foraminiferous Limestone in West and North Lancashire.' We are glad to see that Mr. Jackson has recently been elected a Fellow of the Geological Society.

There has recently been issued from the Taunton Castle Museum, a 'Report of the Excavations at Wick Barrow, Stogursey, Somersetshire,' by H. St. George Gray. This contains an admirable account of the contents of the mound, and with one skeleton was found a flint dagger, almost identical with that from Middleton, figured in this journal for July. In the Wick barrow, as in the Middleton example, the flint dagger was found in association with a 'drinking cup'—an association very rarely met with in British barrows.

MOLLUSCA AT BRAFFERTON.

W. DENISON ROEBUCK, F.L.S.
Leeds.

On the recent excursion of the Yorkshire Naturalists' Union at Brafferton, the Conchological section was represented by its President, Mr. W. Harrison Hutton, and one of the secretaries (the present writer), who worked a line of country extending from Brafferton to Boroughbridge across the battle-field of 1319 on Ellingthorpe Ings) called the 'White Battle' or 'Chapter of Myton' from the number of white-robed ecclesiastics who fought on the English side). Leaving Brafferton Station, while still in Yorkshire N.E., dead specimens of *Helix hortensis* and some *H. rufescens* var. *albocincta* on dandelion flowers were found. Crossing the river into Yorkshire N.W., a log of wood at Thornton Bridge House swarmed with *H. rotundata* in all stages of growth, accompanied by several *H. hispida*, and one *Arion subfuscus*. Near by, *Agriolimax agrestis* was abundant, in company with *Arion circumscriptus*. Taking the road to the south, **Limnæa truncatula* was very common in a ditch or 'slack' in a field by the roadside. At the turn of the road, on banks covered with luxuriant vegetation, a number of *H. hortensis* var. *lutea* 00000 and 12345 occurred, along with numerous beetles (*Chrysomela polita*). At a farm called Treble Syke, a large shallow pond filled with an aquatic *Ranunculus* in abundant white flower, and swarming with tadpoles, yielded a few examples of *Planorbis contortus*. Further south, ditches in the hedge bottoms yielded a few *Limnæa peregra* and *L. truncatula,* and *Pisidia*. The three-spined Stickleback was also abundant. In a belt of planting leading eastward to the Swale, *Zonites alliarius* occurred. The way now led along the windings of the Swale, which was a turbulent, swift, and muddy stream in flood. Numerous slugs occurred, including both forms of **Agriolimax agrestis, Arion circumscriptus,* and examples of **A. subfuscus* and juvenile **A. ater,* one **Agriolimax lævis,* and several examples of **Succinea putris*. The rest of the way, past the bridge leading to Myton and across the battlefield, was absolutely unproductive.

The way to Boroughbridge Station led alongside the left bank of the Ure, which was as clear and transparent as the Swale was muddy. The 5 p.m. train brought the party to Brafferton for the meetings, at which the report showed that fifteen species of mollusca in all had been observed, including *Helix cantiana,* brought from Cundall in plenty by other members. Of these six (marked above with asterisks) were new to the recorded lists for the portion of North-west Yorkshire investigated.

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BIRDS.

White Swallows at Harrogate: a unique occurrence.—In a low outhouse at the rear of some cottages at Starbeck, a pair of Swallows has for several years built a nest and reared young ones. The occupants of the house take pride in the birds, which are comparatively tame. The nest is quite low down, and can easily be reached by anyone from the ground. This year the birds have hatched five young ones, three of which are perfectly white, and the other two normal colour. Unfortunately, I did not hear of this until the birds were well on the wing, so the opportunity of obtaining a good photograph had passed. I have, however, obtained one of the three together (small) on a telegraph standard. They are delightfully dainty and beautiful objects, and as the owner of the house assured me they had all pink eyes, they are evidently genuine Albinos. It is to be hoped they will not share the usual fate of conspicuous specimens, as it will be interesting to note if they return next year.—R. FORTUNE.

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ARACHNIDA.

In a recent visit to Scarborough I captured, amongst other spiders, *Coclotes terrestris* Wid., *Linyphia pusilla* Sund., *Panamomops bicuspis* Camb. These have been identified for me by Rev. O. Pickard Cambridge, F.R.S., and are all new records for the Scarborough district.—H. C. DRAKE, Hull.

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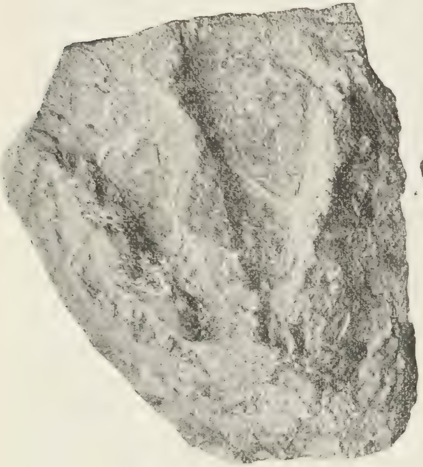
Part 77 of 'The Yorkshire Archæological Journal' contains an illustration of a fine bronze spear, and a bronze axe of the palstave type, found some years ago at Rainton-cum-Newby, in the North Riding. Reference is also made to a polished stone axe-head of Andesitic Ash from the Borrowdale series, recently found near Heckmondwike. A suggestion is made that finds of this kind should be recorded on a map of the county, after the style of the map shewing the various ice-travelled erratics in Yorkshire, which appeared in our July issue.

FOOTPRINTS IN A YORKSHIRE SANDSTONE.

Besides the usual details of the year's work, the Whitby Literary and Philosophical Society's 85th Report contains a list of the fishes and mammals of the district, and also a note by Mr. Harold Brodrick, relating to some footprints which he found at Saltwick. This occurs under the heading ' A Find ! ! ! ' which rather savours of a Patent Medicine advertisement.



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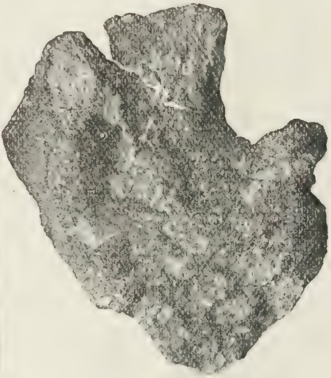

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There are two casts, which ' were found at Saltwick on two separate rocks, which had evidently fallen from the cliff above, they were both close to the cottage, and, in fact, one had been used as a portion of a flight of steps leading to a table used by Mrs. Agar's visitors for tea.'

The original specimens, now in the Whitby Museum, have been kindly submitted to us by the secretary, Mr. Thomas Newbitt, and we have also obtained casts, for our permanent collection, by the kindness of the authorities at the British Museum (Natural History). Before returning the originals we had them photographed (see fig. 1 and 2.)

From the matrix it is pretty evident that the footprints are from the same bed of rock. They are in the form of casts, that is to say they represent the filling in of the impression originally made in the soft material by the footprint, and therefore practically have the same shape and appearance as the feet of the animal or animals that made them.

It is also evident from examining the specimens that the actual impressions were made in a fine material, as between and around the toes there is a thin clay-like deposit. This impression seems to have been suddenly filled in by a coarse, sharp sand, with ferruginous particles ; now a hard sandstone very much resembling the sandstone of the Carboniferous series. In both examples there have been joints in the sandstone, close to the footprint ; and from these, parallel ferruginous bands give some indication of the weathering which has taken place. One of the joints has cut away the tip of the central toe, which means that its original measurement may be a trifle more than that given below.

Fig. 1 shows a distinct impression of a large three-toed foot, the total length of which from the point on the middle toe to the opposite end of the impression is 8½ inches. The two patches of clayey matter in between the toes are clearly shown in this photograph.

The second example, though smaller, is by far the most interesting. As in the previous instance, the central toe is the longest, the total length being slightly under six inches. The same infillings of clay, etc., occur as in the previous example. As pointed out by Mr. Brodrick, there appears to be clear evidence of a fold in the skin joining the two outer toes. In this large footprint there also appear to be impressions of two spurs, or possibly folds, each pointing toward the central toe from the inner side of the outer toes. The most interesting feature in connection with this specimen, however, is an impression of a smaller foot which occurs just to the right of the right-hand toe shown in the picture. This is only 1½ inches in length, and probably represents the print made by the forefoot of the animal ; an examination of other footprint slabs showing that it frequently happened that the hind foot was drawn up to about the same position as that occupied by the forefoot, thus leaving both impressions side by side.

Judging from the matrix, it seems probable that the footprints are in the Estuarine series, and they appear to be the first record of this character in the Secondary rocks of the county. We have given publicity to this interesting find in order that an effort may be made to find the bed in which they occurred *in situ*.

T. S.

1908 August 1.

HORNSEA: ITS MERE AND COASTLINE.

Hornsea, on the Holderness coast, and its Mere, were visited during Whit week-end by a goodly number of Yorkshire naturalists. The party monopolised the accommodation at the Alexandra Hotel, and several were in lodgings in the village; the numbers being augmented daily by parties from Hull.

Although the Saturday was not an ideal day from the point of view of the weather, the party stuck to the programme. The geologists took the walk along the cliffs to Aldborough, in the course of which the unusually severe erosion of the cliffs was everywhere apparent, the average annual rate of seven feet per annum being certainly much exceeded in this district recently. In some cases huge stretches of this year's young corn were halfway down the cliffs. The party was under the guidance of the Hon. Secretary of the Union, and was successful in securing some typical examples of far-travelled rocks, from Scandinavia, Scotland, and the English Lake District. A fine mammoth tooth was also picked up on the beach south of Hornsea.

Photo by] [*F. Appleyard*.

Distant view of Earthworks at Skipsea Brough.

The botanists devoted their time to investigating the flora of Hornsea Mere—the last of the numerous freshwater lakes that once existed in Holderness. The ancient peaty beds of these meres are occasionally washed bare by the tide, and remains of one were seen at Hornsea, just south of the station. They yield traces of typical water-loving plants—a few of which indicate colder conditions than now obtain in the district. Around the present Hornsea Mere the flowers were in wonderful profusion—the coppices being carpeted with the blues and reds of the hyacinth and campion, whilst on the water's marge the yellow of the fading kingcups and the young iris form a brilliant spectacle, relieved by the last of the beautiful white blossoms of the buckbean.

The ornithologists found plenty of scope for work round the Mere, and many excellent photographs of bird life were secured. The entomologists, under the guidance of Mr. G. T. Porritt, were not so successful, the strong wind being a disadvantage.

On Sunday the party was augmented by fresh arrivals, and principally confined its attention to the mere.

Photo by] [*F. Appleyard.*

Lacustrine Deposit and Peat Bed at Skipsea.

On Monday the party was reinforced by some forty members from various parts of the county.

The geologists first visited the pre-historic mound and earthworks at Skipsea Brough, which are considered to be the finest of their kind in the north of England. The central mound is 70 feet in height, and is surrounded by a series of earthworks and ditches, the largest of which is seventy feet high and half a mile long. From the top of the central mound, the structure was described by the Union's Secretary, who stated that, in his opinion, it was at the very least two thousand years old. In Norman times the site was occupied by Drogo de Bevere—a follower of William the Conquerer—who erected a keep of masonry on the central mound. A small fragment of the wall of this is all that remains. From this position the site of the well-known pre-historic Lake Dwelling at Ulrome was pointed out. Walking towards the beach, the party examined the old lake bed, now exposed in the cliffs. This yielded a number of interesting botanical and conchological remains—relics of the primeval flora and fauna of the area.

The botanists, and the general body of naturalists, spent the day in continuing their investigations on the Mere at Hornsea, and at the meeting which was subsequently held, it was reported that important, and, in many cases, entirely new discoveries had been made.

A vote of congratulation and thanks was passed to Lord Avebury by the delegates present, representing over 4000 naturalists in Yorkshire, for his efforts with regard to the Sale of Plumes Bill.

Reports of the work accomplished were given as follows :—Vertebrate Zoology, Mr. R. Fortune ; Conchology, Mr. Harrison Hutton ; Coleoptera, Mr. T. Stainforth ; Lepidoptera, etc., Mr. G. T. Porritt ; Flowering Plants, Mr. J. F. Robinson ; Mosses, Mr. J. J. Marshall ; Fungi, Mr. C. Crossland ; Diatoms, Mr. R. H. Philip ; Geology, Dr. F. F. Walton and the Secretary. Hearty votes of thanks to the landowners for the exceptional facilities given were passed, a similar compliment being paid to Mr. G. T. Porritt for presiding.

The following reports on the excursion have since been received from the officers :—

VERTEBRATE ZOOLOGY.—Messrs. H. B. Booth and R. Fortune write :—As might have been anticipated this section was fairly well represented ; by far the greater part of the members hailing from the West Riding. The Mere and its surroundings proved the great attraction, the avi-fauna of which appeared to them more like that of Norfolk than that of a portion of their own county.

Fourteen species of mammals were identified, of which the following were obtained :—Hedgehog, Mole, Common Shrew, Stoat, Wood or Long-tailed Field Mouse, and House Mouse. In addition to these, two species of bats were observed at dusk—a larger one and a smaller one—(probably the Noctule and the Pipistrelle), but they could not be secured for absolute identification.

Of the fifty-seven species of birds noted, an unusually small proportion for the time of the year were summer visitors, viz., only thirteen species, against forty-five residents. On the Mere, Mallards, Tufted Ducks and Pochards were common, and about two pairs each of Shovelers, Teal and Great Crested Grebes were noted. Coots were abundant, and Waterhens not uncommon, but the Little Grebe was not found to be so common as might have been expected. Around the margins of the lake the Reed Warbler abounded, and the Reed Bunting, Garden Warbler and Sedge Warbler were numerous in suitable places. Nests and eggs of the following species (amongst others) were found :—Tufted Duck, Shoveler (?), Reed Bunting, Reed Warbler, Tree Creeper and Skylark. With eggs, and also with young, was the Mallard, Coot and Waterhen. With young only were the Pochard, Great Crested Grebe, Little Grebe and Blue Tit. A nest of the Waterhen, containing six eggs, built under the gangway of the landing-stage, only a few inches below the floor level, claimed a good deal of attention, it seemed a most unlikely place for a nest, as people were continually walking over and about it.

On Saturday, it was interesting to note how, owing to the heavy wind blowing, all the Swallow tribe and the Swifts appeared to have deserted the town, repairing to the Mere, where, obtaining shelter from the strong wind at the lea of the trees fringing the water, they were very busy hawking for insects which were rising in myriads from the reed beds.

It is equally interesting to note that birds which were expected to occur rather commonly were not noted, whilst others were in smaller numbers than was anticipated. Of these the Corncrake, Magpie, Nightjar, Yellow Wagtail and Green Woodpecker were neither heard nor seen. One pair each only of the Tree Pipit and Pied Wagtail was seen, and the Mistle Thrush and Greenfinch were not so common as we expected to find them. The Corn Bunting was very common. Several Cormorants and nearly a hundred Herring Gulls spent the greater part of the day on the Mere, but all of them were in various stages of immaturity. On Monday, a very large flock of Herring Gulls frequented the Mere for a time. An ineffectual attempt was made to get through the almost impassible swamp to the heronry, but several of the birds were seen. A very pretty incident was witnessed by one party in a boat whilst investigating a thick patch of reed bed. Suddenly, and by a series of dives, a pair of Great Crested Grebes appeared quite close to the boat. By an unknown signal of the parents a young Grebe left the reed bed close to them. One of the old birds slightly sank its body, and uplifted its wings, and the young bird (but a few days old) mounted on to the back of the parent, and the trio sailed away in triumph. In order to test the staying powers of the young bird, the boat was at once put at full speed after them, and the birds made several long dives, but the young Grebe never lost its hold upon the back of its parent, who had so daringly rescued it when it appeared to be in imminent danger.

A native of the district, seeking for information on some local bird question, enquired of a reverend member of the party if he was a 'Horny-theologist" *, and by his insufficient knowledge of scientific terms, coined a word which, judging by its quick and general popularity with all the members present, bids fair to supercede the usual term by which students of bird life are generally known.

No reptiles were seen, and only two amphibians—the Frog (in abundance) and the Toad. Four fishes were noted—the Pike, Roach and Perch in the Mere, and Eels in an adjoining stream which runs into the Mere.

Mr. W. Denison Roebuck writes :—The conchological section was represented by its president, Mr. W. Harrison Hutton, of Leeds, Mr. A. J. Moore, of Hull, the Rev. F. H. Woods of Bainton, and other members, and Mr. Hutton reported that five slugs, thirteen land shells and thirteen freshwater shells—thirty-one in all—were collected in and around Hornsea Mere. On the cliffs were found *Agriolimax agrestis*, *Pyramidula rotundata*, *Helicella caperata*, *Hygromia granulata* var. *cornea*, *H. hispida*, *H. rufescens*, *H. aspersa* (copulating) and var. *nigrescens*. In the plantation occurred *Vitrea crystallina*, *V. nitidula*, *Helix hispida*, *Zonitoides nitidus*, *Euconulus fulvus* and *Cochlicopa lubrica*. Under a log near the edge of the mere were found *Succinea putris* and *S. elegans*, and along the mere edge also occurred *Agriolimax agrestis* vars., *reticulata* and *albida*, *A. lævis*, *Arion ater*, *A. intermedius*, *A. hortensis* and var. *nigra*. The water shells found in the mere were *Limnæa peregra*, *L. palustris*, *L. truncatula*, *Planorbis albus*, *P. carinatus*, *P. umbilicatus*, *P. vortex*, *Physa fontinalis*, *Bythinia tentaculata*, *Valvata piscinalis* and var. *acuminata*, *Sphærium rivicola*, *S. corneum*, and *Anodonta cygnea*. The Rev. F. H. Woods,

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* There was surely a touch of sarcasm in this.—Ed.

B.D. brought the var. *exalbida* of *Helix aspersa* from Skipsea Brough, and a number of marine shells were collected by various members.

ARACHNIDA.—Mr. T. Stainforth writes that the following spiders, identified by the Rev. O. Pickard Cambridge, F.R.S., were obtained in the neighbourhood of Hornsea Mere by Messrs. H. C. Drake, E. A. Parsons, J. Porter, A. C. Willford and himself. Of these, eighteen (marked with an asterisk) are new to the published East Riding List,* and three (marked †), new to the Yorkshire List. Most of the species are common, the most rare and interesting, Mr. Cambridge writes, being *Tmeticus affinis* Bl., as Blackwall's two original type specimens came from Hornsea.

ARANEIDEA.

Harpactes hombergii, Scop.*
Clubiona reclusa, Cambr. ♂
,, *neglecta,* Cambr.*
,, *holosericea,* DeGeer* ♂&♀s
Amaurobius fenestralis, Stroem.
Tegenaria derhamii, Scop.
Theridion denticulatum, Walck.
,, *varians,* Hahn.
,, *pallens,* Bl.* ♀
Phyllonethis lineata, Clerck.
Steatoda bipunctata Linn.
Linyphia montana, Clerck. ♀s
,, *peltata,* Wid.
,, *impigra,* Camb.† ♂ & ♀s
,, *hortensis,* Sund.
,, *clathrata,* Sund. ♂
Leptyphantes minutus, Bl.
,, *tenuis,* Bl. ♂s
,, *ericæa,* Bl. ♀s
Bathyphantes approximatus, Cambr. † ♂
,, *nigrinus,* Westr. ♂s&♀
,, *gracilis,* Bl. ♀
,, *dorsalis,* Wid. ♂s & ♀
Porrhomma pygmæum, Bl. ♂s
Tmeticus affinis, Bl. ♀
Microneta saxatilis, Bl.* ♂
Gongylidium graminicolum Sund.* ♂
,, *rufipes,* Sund. ♂ & ♀
,, *gibbosum,* Bl.* ♂
,, *tuberosum,* Bl.* ♂
,, *dentatum,* Wid.† ♂
Gongylidiellum vivum Camb.* ♀
Erigone dentipalpis Wid. ♂s
,, *Atra* Bl. ♂
Enidia bituberculata Wid.* ♂
Tetragnathà solandrii Scop.*
Pachygnatha degeerii Sund.
,, *clerkii* Sund.
Meta segmentata, Clerck. ♂
,, *merianæ* Scop.
Zilla x-notata Clerck.
Epeira umbratica Clerck.* ♀
Xysticus cristatus Clerck.
Oxyptila trux Bl.
Pirata piraticus Clerck.
Tarentula pulverulenta, Clerck.*
Lycosa amentata Clerck.
Epiblemum scenicum Clerck.

PHALANGIDEA.

Nemastoma lugubre O. F. Müll.

NEUROPTERA AND TRICHOPTERA.—Mr. G. T. Porritt reported that the Neuroptera and Trichoptera taken included *Nemoura variegata, Sialis fuliginosa, Hemerobius lutescens, H. subnebulosus, Colpotaulius incisus, Glyphotælius pellucidus, Limnophilus auricula, Molanna angustata, Mystacides longicornis* and *Æcetis ochracea.*

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* Trans. Hull Scient. and Field Nat. Club, Vol. IV., Pt. I., p. 30.

MARINE CONCHOLOGY.—The Rev. F. H. Woods writes:—Fortunately the storm on Saturday, which disappointed those who had hoped to boat on the Mere, proved a boon to Marine Conchologists, and quite unusual quantities of shells were washed up. Some of these are very rare on the Yorkshire coast, as, for example, *Artemis exoleta* (see list by Rev. W. C. Hey, 'Naturalist,' vol. x., p. 25), of which there were quite a large number of complete specimens. Curiously enough, *lincta*, which is fairly common on this coast, was not found. Another very interesting find is *Pecten egrinus*, of which two single valves were secured. To these should be added specimens of *Cardium norvegicum*, which does not appear to have been found by Mr. Hey himself, but adopted to his list from the Scarborough Museum, where the specimen is marked 'Scarborough.' Another rather unusual feature was the extraordinary quantity of the Common Cowry, *Cypræa europæa*. I picked up over fifty specimens in an hour's time on the shore near Rolston.

A full list of species is given below. It should be noted that these do not include any microscopic forms, which appear to be almost absent from this part of the coast, while abundant at Filey and northwards. It is, of course, uncertain how far this list represents the marine conchological fauna of the district, as many of the shells may have been driven some distance from the north.

Pholas candida
,, *crispata*
Saxicava rugosa
Solen siliqua
,, *ensis*
Tellina tenuis
,, *balthica*
Donax anatinus
Mactra elliptica
,, *stultorum*
Lutraria elliptica
Tapes pullastra
Venus gallina
Artemis exoleta
Cardium edule
,, *echinatum*
,, *norvegicum*
Mytilus edulis
,, *modiolus*
Pecten opercularis
,, *pusio*
,, *tigrinus*
Anomia ephippium
,, *patelliformis*
Patella vulgata
Trochus cinerarius
Littorina obtusata
,, *rudis*
,, *littorea*
Natica catena
Murex erinaceus
Purpura lapillus
Baccinum undatum
Fusus antiquus
,, *islandicus* (*gracilis*)
Pleurotoma turricula
Nassa incrassata
Cypræa europea

MYCOLOGY. — Mr. C. Crossland writes:— The three mycologists—R. H. Philip, W. Robinson, and the writer, spent their time around the margin of the mere. There was any quantity of material to be found on the dead stems of *Phragmites communis*, *Epilobium hirsutum*, and other decaying vegetation. Members connected with other sections brought in several interesting agarics, among them being *Pholiota dura* (Bolton) and *P. radicosa* (Bull.). The latter, with its rooting stem and strong smell was found on a decaying stump. Some of the micro-material still remains undetermined, but we are hoping to get through it before long. Of the species determined, represented by the following list, two are new to Britain, four new to the county, and thirteen new to vice-county, S.E. These are respectively noted by the signs *, †, ‡. In addition to the four new Yorkshire species, there is *Periconia pycnospora*, but this was first found in the county at the recent Brafferton Excursion; it was not included in the Brafferton list, as it was not then definitely determined. The new British discomycete—*Tapesia retincola*—was fairly abundant on dead stems of *Phragmites*. *Heptameria graminis* also on *Phragmites*, has been only once previously recorded for the county—'Grev.,' XVIII (1890), p. 59 for Terrington, but this record was accidentally overlooked when the 'Yorks. Fung. Flo.' was compiled. The finding of the Æcidium of *Puccinia orchidearum—phalaridis* Kleb. on *Listera ovata* is also worthy of special note, as it appears to be the first time it has been noticed on this particular host in Britain.

The following is a full list of species collected so far as they have been determined. * New to Britain; † New to Yorkshire; ‡ New to V.C.—S.E.:—

Armillaria mellea. Mycelium on fallen trunk.

Tricholoma gambosum. In pastures.

Pleuteus cervinus. On decaying stump.

Pholiota dura.

P. prœcox. Both on the ground.

P. radicosa. On decaying stump.

Inocybe rimosa. On the ground in woodland.

Hypholoma fasciculare. On decaying stumps.

Psathyrella disseminata. In crowds on decaying mossy stump.

Marasmius oreades. In rings in pastures.

Polyporus squamosus. On new stumps.

Polystictus versicolor. On fallen trunk.

Poria vaporaria. On rotting, fallen branches.

Fomes fomentarius

‡ *Hydnum argutum.* On dead wood.

Stereum hirsutum. On fallen trunk.

Tremella mesenterica. On decaying, fallen branches.
Dacryomyces stillatus. On decaying worked wood.

‡ *Melampsora cerasti.* On *Cerastium arvense.*
Puccinia pulverulenta. Æcidiospores on *Epilobium hirsutum.*
P. pimpinellæ. Uredo stage on *Anthriscus sylvestris.*
P. phragmitis. Æcidiospores on *Rumex hydrolapatham.*
P. Trailii. Æcidiospores on *Rumex acetosa.*
‡ *P. magnusiana.* Teleutospores on last year's leaves of *Phragmites communis.*
† *P. perplexans.* Æcidiospores on *Ranunculus acris.*
P. suaveolens. Uredo stage on *Carduus arvensis.*
P. orchidearum-phalaridis. Æcidiospores on *Listera ovata* and *Orchis latifolia.*
P. malvacearum. On *Malva rotundifolia.*
Triphragmium ulmariæ. Æcidiospores on *Spiræa ulmaria.*
‡ *Xenodochus carbonarius.* Æcidiospores on *Sanguisorba officinalis*
‡ *Ustilago violacea.* On the anthers of *Lychnis dioica.*

Hypocrea rufa. Conidial stage on wood.
Nectria cinnabarina. On fallen branch.
Dialonectria episphœria. On a decaying effused pyrenomycete
Xylaria polymorpha. On decaying stump.
X. hypoxylon. On dead trunk.
‡ *Valsa dissepta.* On dead elm branch.
‡ *Eutypa Acharii.* On fallen beech branches.
Byssosphæria aquila. On dead wood.
Lophiostoma caulium. On dead stems of *Epilobium hirsutum.*
† *L. arundinis.* On dead stems of *Phragmites communis.*
Metasphæria complanata.
‡ *Raphidospora urticæ.* On nettle stems.
‡ *Raphidospora acuminata,*
Heptameria doliolum.
All three on dead herbaceous stems.
‡ *Heptameria graminis.* On *Phragmites communis.*

Peziza ampliata. On road scrapings.
Lachnea scutellata. On rotting wood.
Dasyscypha virginea. On dead herbaceous stems.
D. acutipila. On dead stems of *Phragmites communis.*
D. hyalina. On decaying wood.
* *Tapesia retincola.* On dead stems of *Phragmites communis.*
Helotium cyathoideum.
Helotium scutula.
Both on dead herbaceous stems.
Belonidium pruinosum. On a decaying, effused pyrenomycete.
Mollisia cinerea. On decaying twigs.
M. atrocinerea. On dead herbaceous stems.
M. dilutella. On dead *Epilobium hirsutum.*
‡ *M. arundinacea.* On dead stems of *Phragmites communis.*
‡ *Cenangium furfuraceum.* On hazel branch.

Pilobolus crystallinus. On horse dung.

‡ *Sporotrichum sulphureum.* On dead wood.
Botrytis fascicularis.
Torula herbarum.
† *Periconia pycnospora.* The last three on dead herbaceous stems
Cladosporium herbarum. On dead herbaceous stems.
† *Macrosporium commune.* On grass.

Stemonitis typhina.
S. Friesiana.
Perichæna corticalis.
Lycogala epidendrum.
Chondrioderma difforme.
Ceratiomyxa mucida.
All on rotting wood.

T. S.

A TRIO OF BRITISH AND ALIEN PLANT-LISTS.

F. ARNOLD LEES, M.R.C.S., Etc.

THE last decade's advance in Botany is on a par with that of Education and other things. Emulating the Teuton and the Gaul in the jotting of details, as in the enunciation of broad principles, British field botanists have been re-searching as well as insearching, and one expression of the result is the appearance of the three catalogues that furnish the 'text' for what I wish to say—caring little whether I am agreed with or not, at the finish, by who have interest enough to look into my references for themselves, if only my object of stimulating inquiry be attained. My ideas are those of one somewhat out of-touch with modern specialism along some lines. Adverse circumstances have denied me the opportunity a certain leisure should bring, but the being out of collar gives a degree of freshness to the starting anew; and 'lookers on,' who have a sufficient familiarity with the 'game,' proverbially see most because unshackled by the absorption entailed in manipulatory formulæ and personal labour.

The swiftly-successive publication, early in the current year, of three more or less official lists of British Spermophytes, Pteridophytes and Charads, calls for some mention and examination, inasmuch as it connotes the tide-mark of our botanic experts' views on plant nomenclature and birth-grade; although finality in such matters can hardly be said to have been reached. They severally mark the termenologic outcome of the Botanical Congress at Vienna in 1905, which 'insisted' on the adoption of 'the earliest specific name' attached by diagnosts, 'no matter under what genus' such name was first described. In sum, this 'battle' of 'Flags florent' has *not* lowered the Standard of the immortal Linnæus, inimicous as it may have seemed to his amphiental fame: BELLIS PERENNIS is still *Bellis perennis*, L., albeit one variety or state, *discoidea*, devoid of its ray or ruffle has modestly come to the birth! There was certainly a 'clear call' for *one* such catalogue; and now that we have *three* to choose from, and bring our individual knowledge (as to flower faces) up to, as ever happens in the march of mentality, there is a clamant need of a manual or handbook which shall define for us the names, running respectively in the three lists up to 1700, 2075, and 2990 or thereabout. In these days of dumping imports, whether as raw food-stuffs, cotton-fibre, fodder, hides, fleeces, plumage of birds or earth itself as ore or ballast, the collector may (and does) find almost anything in the germ line trying conclusions with our indigens, inland or littorally, fulfilling more or less completely the behest of palinureing Phœbus to bring forth its like, and possess the earth. This is not 'writ sarcastic,' nor is it a *reductio ad absurdum*, since we all of us 'want to know' the style and title at least of the creatures that introduce themselves to our notice when we take our walks abroad; and, unfortunately, nor the Groves's edition of Babington's *Manual*, nor Dunn's *Alien Flora of Great Britain* give us much more than a stone (seed) name in response to our cry for bread (flower of the understanding). We have Loudon, his *Encyclopædia of Plants* of 1849, certainly, describing over 18,000 'species' (as then understood) with small woodcuts of nearly 10,000 of them; but our modern herbarist is to-day an analyst and a 'splitter' rather than a Lindleyan or a Benthamite, and so dubs the goodly tome of thirteen hundred pages, rococo and a weariness to the eyes. Nevertheless it is *wonderful* yet; and, here and there, prophetically and presciently affords us a 'light' to our acrostic of the field which all else denies. To give only one illuminating example. Item 844* of the 10th edition of the *London Catalogue of British Plants* is 'Inula britannica, L. 1.', and the same species appears in G. C. Druce's masterly Oxford *List of British Plants* as '*1281 *britannica*, L. Eur.; [Leicester]'. (Also Yorkshire, 'native' J. G. Baker, *N. Yks.* and Hooker's *Students' Flora*, ed. 3, 207—it is the Elecampany of Skipbridge and Thorp-arch, given under *I. Helenium* in my *W. Yks. Flora*), but for information how this British plant, named after our island in 1753 by Linnæus himself, differs from the Sunweed of the Orient which sprang from Lena's tears, we are driven, to-day, to desuete *Loudon*, p. 714, No. 12149; where below *I. Helenium*, (said to grow to 4 feet, and have *amplexicaul leaves*, somewhat *toothed ovate rugged downy beneath, scales of the involucre downy*) we find 'britannica, W.' [Willdenow, who grew it in the Berlin garden, and described it therefrom] '*creeping rooted perennial, 2 feet in stature, yellow flowered,* 1759, *Germany*' [but it is Helenium which is Prussian, and britannica which is British] '*leaves amplexicaul lanceolate serrated at base, pilose beneath, with a villous corymbose stem.*' In this we have sufficient differentiation betwixt the two, but probably not one in a score collectors will have the contrasted characters accessible. The need of a new and ampler descriptive Flora is thus apparent ; to say nothing about the ' newer ' species, splits or discovered since 1850, which the Oxford and the London Lists furnish names of.

As to the three catalogues themselves, and their merits. In its simple way, and at the under-cost price of *Fourpence,* the *List of British Seed-Plants and Ferns* with its *Corrigendal* leaflet of December 1907 is useful because (1) it gives the various dates at which the species were first described from Linnæus's *Species Plantarum* 1753, down to 1888 (*Cephalanthera longifolia,* Fritsch) or 1889 (*Potamogeton varians,* Morong ex Fryer), or a little later, so that it is fairly ' up-to-date,' and enables one to form a clear idea of the real or false stability of the growth-detail on which ' Character ' rests ; and (2) because it correlates with its prior-established names those adopted by Hooker, Bentham and Groves, in their respective works of 1884, 1892, and 1904. Some disadvantage will, however, be keenly felt by students of our ' critical ' genera *on the move,* Brambles, Roses, Hawkweeds and Willows, who are practically fobbed off by advice to consult ' monographs ' as to the first three, whilst revisionary almagests dealing with Willows and Pondweeds are non-existent. That Dr. Rendle has been bold enough to ' cut the painter,' and let drift the Sarnian species ' which have no claim to be considered as belonging to the British Flora,' matters almost less than the ruthless barring out of Aliens ' on the make ' within our National ' marches,' but (since happily few) to exclude ' plants *formerly found* in Britain *but now extinct* ' is indefensible, since we can neither be quite certain as to the one fact, nor predicate with any confidence the other. Still, viewed as a whole, within its limitations, the *Seed-Plant* List of the British Museum Trustees fills its place in the ranks with the efficiency of a well-drilled private : one likes the look of its clear-lined countenance. The monumental, unique *Index Kewensis* (1885-95) has already been back-passed in that race to the rear, to where straining men would find the palæo-fossil names of the botanic Adams. Several I. K. names have been superseded by unfamiliars (*Crepis capillaris* replaces *C. virens,* for example, and Sir Joseph Banks's *Leontodon nudicaulis* supplants Linnean and I. K. *hirtus*) for the disease of *resurrectionitis* was not stamped out even by that learned and laborious Jacksonation of Botanography, incepted by ' the munificence' of C. Darwin and 'the profound knowledge and critical acumen' of Sir Joseph Hooker. Like some epidemic it crudesces in spots at times almost—parody without profanity—as if to the hortosiccan mind of the affected 'a flower's crown of flower's to have borne an elder name.' Yet, as I began by saying *Bellis perennis* is *Bellis perennis* still; not so, however, alas! Peter Bell's and Beaconsfield's primrose 'by the river's brim,' for over that this nice battle of flowers has raged by permit of a certain dubiety; the *Seed-List* at first setting it down as 'Primula acaulis, Linn *Flora Anglica,* 12, (1754)' and then in corrigenda correctly as *P. 'vulgaris Hudson'* on faith of 'Flora Anglica, 70 (1762).' with which both *Oxford List* and *London Catalogue* 10th Ed., agree. The fact is, I believe, that Linnæus adopted the name '*acaulis*,' either from Hill who in 1756 so called the prevailing sessile-pedicelled form of primrose; or from Jacquin; publishing it as an integer in *Flora Anglica,* in *Amœnitates Academicæ,* vol. iv., 97. The first volume of these Transactions was issued in 1749, the fourth in November 1759. 'Var acaulis' Hill, or 'species' Linn, therefore remains only as the title of a var. or portion of 'English Primrose' growth; and the less frequent polyanthus-stemmed umbellate-flowering state has to be accorded its particular earliest name, as such, viz: *caulescens,* Koch. (*circa* 1841 or 2). In this skirmish Hudson conquers—if one may put it so—in that of his pretty erection *Ficaria verna* (1762), despite a difference between that and the rest of Ranunculus, both Linnean title and genus being the elder by a decade nearly, remain *in statu quo;* and Hudson's apt specialization is relegated to the lumber-room of antiques not antique enough!

Now as to the *London Catalogue,* 10th edition (Geo. Bell & Sons, 48 pages, 9d.; cl. interleaved, 1s. 3d.), drawn up by Mr. W. A. Clarke with the co-operation of several specialists who have revised and studied certain genera, what, in its 2075 numbered names is given is 'good' distinctly, but it does not give enough to satisfy botanic appetite. Who are avid of information it irritates by a bald laconicity and dogmatism, since there is not even that alternative sort of compromise which marked the unlucky 'nine' [Edn.] of 1895, out of the complexities and 'complicities' of which, as in most matters of clature and census, the hungry, but fastidious critic (and there are such freaks) can pick up something. The first, oldest name is not necessarily the most felicitously descriptive. If a species is called Stellanthus pinnatifolius (say), we know something about it besides the order in which it is placed, but if that name has had to give way to *Hanburyanum* or *Ridiculus Mus* or something else, some men, who take leave to have sentiments about things, are disheartened, if not disgusted : for example—hasty Hill's '*Radicula*,' rooted first, in point of time (1756) but a 'badly defined genus . . excluding . . the Water-cress' (Druce) will never usurp and replace that of Nasturtium for our saladic olitory, in the mind of the present generation—'*Radicula officinalis*, Groves' academic enough title, has already been torted into the reminding compromise—under the 'Rules' of the prevailing Medes and Persians in matters botanical, of *Radicula Nasturtium aquaticum* ; which, if not terse, *is* telling !

Edition Tenth, then, is a bald catalogue, beautifully printed, but a sort of colossal or fossil 'nomen nudum' itself, fit enough to serve as an 'Exchange' List—no stick is too green to beat a destructive dog with—exceedingly 'correct,' like to a lay figured well-dressed, and of good form, but with an 'air' about it as of the last and finished product of botanic civilization that one can do nothing with ; one must either take it or leave it as it is. Already there are rumours—but quite unofficial ones—that concensus of criticism will compel a revised Eleventh at no distant date. Some such 'quick change' took place once before. And the time-honoured but unnatural sandwiching of the Gymno-spermæ (Conifers) betwixt the Cupuliferæ and the Monocotyledons has been continued, whereas in the Druce Oxford *List of British Plants*, precedent in publication, the Pinaceæ correctly and suggestively find place immediately before the Pteridophytes which commence with the *cone*-fruited Horsetails ; unless, indeed, the arrangement of the German 'school' of Engler and Prantl, based upon the Theory of Descent, beginning with the primitive, less complex structure of the reproductive organs, were to be adopted ; as indeed Alexander Irvine tentatively attempted as far back as 1858 in his scholarly but rather slipshod and jumblingly constructed *Handbook of the British Plants*. As the able and original Frederic N. Williams said, in reviewing Lester-Garland's *Jersey Flora* (1903) 'the pre-evolutionary system associated with the names of Jussieu and De Candolle, was but little less artificial and far less convenient than the so-called sexual system of Linnæus.' For the rest the *London Catalogue*, 10th Edn., its virtues are those of the single eye, the definite view—synonyms are avoided, save where specific names differ, *i.e.*, the Cranberry (Oxycoccus, Hill) is Gilibert's *quadripetala* but *palustris* of Persoon. The late greatly lamented W. R. Linton, author of an almost perfect Flora (that of Derbyshire), and of *the* most illuminative and up-to-date account of *the British Hieracia* has brought the Hieracium part of it, Nos. 932 to 1064 inclusive, 'as far as possible up-to-date' by the light accorded him through correspondence with 'Scandinavian experts.' The Rev. E. F. Linton's Salix list, Nos. 1497 to 1516, has shrunken since Edn. 8th (1886) from 31 'species' to 20 ; whilst the titles which represented the 30, over a score of these shew as what they are—Hybrids naked and unashamed. One cannot but be glad of this careful investigation into our British 'species' since that date, not Willows alone, but Mints, Orchids, Pondweeds and Sedges, some genera of Grasses, Scrophulariæ, Onagraceæ, Saxifrages, Potentillas, Violas, Caryophylls and Eye-brights, having demonstrably been in the habit, or acquiring the trick of hybridising. This was either not always the case, or botanists in Smith's and Boswell-Syme's day were lacking in *flair* for open-air field study. I rather incline to the former view, that a cycle in the existence and assurgence (so to say) of certain genera, Brambles markedly, has been reached in the past half-century *in Britain*, which has given stamen and pistil their Natural Chance !—their field arrived, their innings come, the wide-eyed open-air botanists of the Newer School, bringing a greater intellectual wealth of associated ideas to bear upon field-flower collecting and connotation, have shrewdly spotted '*species*' (so to say, again, for lack of a better word) in the act of self creation ! The term 'species' is ours not theirs be it remembered. The Mints even illustrate this—Dame Nature has 'straddled across the growing Mint' as the folk-lore phrase has it, without law or license, since the sweet saucy *Mentha spicata* (viridis) was forethoughtfully brought across the water ; and *Mentha 'rubra,' Mentha 'gentilis'* and suspectedly another yet of our 'native' group have been born, grown up, and colonised ! We may well have sought for years and years to re-discover or identify the '*Mentha pratensis*' of Sole, and Wiltshire (on paper) for the reason it was *likely* a passing phase of the family which could not perpetuate its kind. Hybrids, infertile and unstable at first, with time and the proper degree of dilution of their cell-syncrasies (probably) become more and more a race with fixed cognizable differences :

we don't express *all* when we speak of the maturing of *seed* (as respects a 'species'); as in *Armoracia*, as in *Crocus sativus* and '*nudiflorus*,' the organic vitality has not 'shot its bolt' with a green seed pod, it has other dodges that, tiding over a decade more or less, can make a 'species' of it yet, even to our eyes. All this, however, is plainlier hinted at in G. C. Druce's more compendious *List*, which brings us to the far-and-away most satisfying dish of the three.

In several directions the Oxford *List of British Plants, containing the Spermophytes, Pteridophytes and Charads. . . Natives or growing in a wild state in Britain, Ireland and the Channel Isles* (Clarendon Press, 104 pages, 2s. 6d.), is a new departure from a new terminus, and along lines that allow of many more stational stops and crossings being indicated than in the Catalogue last dealt with.

Throughout its 2958 numbered names, raised to 2991 with the additions of a final page, a Census of county and vice-comital areas in which the 'species' occur is given; the Hibernian census is added, and whether it has been found in one or more of the Sarnian islands is appended, when restricted to any of these. The oldest names are adhered to, reasons being given for certain innumerous exceptions. Synonyms take up a little space, but being so illuminatively useful are freely inserted, those of the indispensable *Index Kewensis* notably so. As the author restrainedly says 'there must be diversity of opinion, and exception may quite fairly be taken to some of the names employed,' but a most meritorious attempt to be above all things consistent has been made. In this dry-as-dust arena amid this nomenal pother it will be enough to say here that *Spergularia* remains, *Tissa*, Adans., the already unweildy *Arenaria* for the *Buda* split-off, and *Lepigonum*, being rejected; whilst both *Parantucella* and the earlier 'badly defined' *Trixago*, *teste* F. N. Williams, are lost in *Bartsia* for the somewhat anomalous *B. viscosa* (No. 1947 in *List*); the occasional European ballast alien *Bartsia Trixago*, the yellow Bladder-Wattle with villous calyx and deeply-toothed leaves, finding its due place (No. 1946), albeit (with many another strange-face) missed out of Dunn's *Alien Flora of Britain*. Where this *Oxford List* leaves something to be followed up, it gives a fillip to our zest—no 'Will o' the Wisp'—by some clue of Reference to the way one must go to reach the goal of full knowledge. I have found it even fascinating, for a goodly number of indi-

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cated Inquiry Offices are as necessary as any other sort. This is of itself no mean merit, and it shews (on every page), that personality and enthusiasm, coupled with capability in the maker, which is a subtle compliment to the would-be masterer of its contents. It is, of course, the expression of individual opinion largely; but does that not all the more interest the conner of itself?

For the rest it includes the names (italicised) of many more Strangers, Casuals and Aliens of all classes, than even *Dunn;* and it further indicates the countries or hemispheres which are their headquarters. The abbreviations referring to these are all understandable: 'Amph.'=*amphiens,* both sides of the globe [Oxalis, Sida, etc.]; 'Calpe'—Gibraltar; 'Mer.'= meridional, Southern; for example. Cilicia (sub *Bromus,* 2810) is the old Mediterranean district of Asia Minor; and so on. We see how Cosmopolitan British Trade has got to be, through its adventitious or vicarious imports of sperm in dozens of ways. The 'Colonists' To-Be of our fields and shores are coming in relays (failures mostly yet as far as establishing themselves is concerned, while conditions are what they are), a few only, like *Matricaria suaveolens* (*1362) bidding fair to be what Poppies are in our 'British Flora' (like the English language assimilating the kernels of many others); unmistakably forcing on our minds the historic lesson—that is *just* nor more nor less, *how* a moity, if not more, of our changing, varying *flora* was made up! It is not long—as floral immigration goes—since the Roman Invasion brought *Urtica pilulifera* to Norwich, and even Yorkshire, or since the Phœnicians brought our dubious *Papaver,* our early Eastern travellers other things, or the Saxons and Flemings *Isatis,*and that other blue wool-dyeing Dane's-Elder (although it, like *Campanula persicifolia* and *Althœa hirsuta* may be really indigens in the south and mid-west). But to have a full list (or nearly full—for something new will be here to-morrow!) of British Aliens is most instructive; ay, and profitable to dwell upon, when so many of our *ancient* settlers and 'rarities' are going or almost gone, and incomers so easily detected. And a careful consideration of the situations our 'Aliens' fill when at Home, tells us something too; hinting *why* so few, very few, 'New British' species are discovered in our remoter or rocky fastnesses. The Donn type of 'discoveries,' the Iceland poppy, the *Silene alpestris* lot, *can't* get here; and *if* they were ever integers in the florula of an area it was by reason of some unjustifiable deliberate 'enthusiasm' to an end. Luckily we know how *Calla palustris* came to its pond in Surrey: we don't know how *Ledum palustre* came to N. Britain. But their names are here in this eye-opening *Oxford List*, and many and diverse will be the discussions it will provoke. Yet it is to be honestly welcomed.

(*To be continued*).

FIELD NOTES.

BIRDS.

Early Migrants in an exceptionally late year.—It may be interesting to note, particularly considering the lateness of the season, that on March 31st, a Sand-Martin was seen on the Aire between Saltaire and Bingley. It was picking up something off the river, hovering like a Wagtail to secure the floating food. I could not make out what it was feeding on, although many times within a yard or two whilst it was thus engaged. There was no fly on the wing. Wagtails—pied, were in swarms, and certainly the largest flocks I have seen.

April 5th—Chiff-chaff observed. This species does not breed in the district, but nearly every year is noted in passing.

April 7th and 8th.—In the same district, and scarcely a feather to be seen.—W. H. Parkin, Shipley.

Pied Rook at Huddersfield.—During the past few days a rook having a broad bar of white feathers across each wing was flying with its companions in a field near this house. The effect when the bird was on the wing was very striking, reminding one of a magpie, though the under white parts and the long tail of that bird were wanting.—Geo. T. Porritt, Dalton, Huddersfield, July 6th, 1908.

Great Spotted Woodpecker at Gainsborough.—In Mr. Max Peacock's 'Birds of North West Lindsey,' in the July issue of 'The Naturalist,' allusion is made to the Lesser Spotted Woodpecker recorded by me as being met with about Gainsborough, but he omits my record of the Great Spotted Woodpecker which, on several occasions, has visited the bones and food put out for the birds in my garden in winter—see 'The Naturalist,' 1902, p. 233.—F. M. Burton, Highfield, Gainsborough, July 1908.

GEOLOGY.

Belemnite in Black Flint in East Yorkshire.—During a recent visit to Atwick, near Hornsea, I found on the beach a small nodule of black flint, in which was firmly embedded the larger portion of a belemnite (*B. lanceolata* ?). The flint itself is of the black type, so familiar to collectors on the East Coast, and it is still questionable as to where it originally came from. Probably the passing of a bygone glacier over some chalk deposit now in the North Sea might account for the presence of the flint in the Holderness district. No similar black flint is to be found in the chalk of the North of England at the present time. The belemnite, around which the concentric layers of flint can be seen, is also commonly met with in the drift of East Yorkshire, and the same species cannot be discovered in the local chalk. As this belemnite was found embedded in the flint, there can be no doubt that both were derived from the same deposit, and thus this specimen is of value in proving the foreign origin of the belemnites so common to the Yorkshire drift.—G. SHEPPARD, Withernsea, July 4th, 1908.

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FUNGI.

***Coprinus tigrinellus* Boud. in Lincolnshire and Derbyshire.**—It may be worth recording that this beautiful little Coprinus has occurred in some abundance both here and in Derbyshire this summer. Here it occurs in an osier plantation on decaying remains of *Carex acutiformis*, sometimes on decaying sheaths at the base of living plants. Shortly after discovering it, I sent a sketch and spores to Mr. Gibbs, of Derby, and by a most curious coincidence on the very day he received my letter, he came across the same thing while searching for Discomycetes. In this case it grew 'on the decaying leaf-sheaths of living leaves of *Juncus articulatus* in a swampy field by the side of the Derwent, near Ambergate.' It appears to be closely related to *Coprinus Friesii* Quel., but is easily distinguishable in the field by the dark brown flecks on the top of the pileus. It does not appear to have been previously recorded for Great Britain. For the identification of the species I have to thank Mr. Gibbs.—H. C. HAWLEY, Boston, Lincolnshire.

REVIEWS AND BOOK NOTICES.

Comparative Anatomy of the Vertebrates. Adapted from the German of **Dr. R. Wiedersheim** by **Dr. W. N. Parker.** Third Edition. MacMillan & Co., 576 pp., price 16/- net.

It would be difficult to estimate the debt owing by the scientific world to Messrs. MacMillan, for the all-round excellence of the various and numerous treatises which they have produced. That now under notice has stood the test of time, and has been largely used by students of anatomy and zoology. The present edition is founded on the sixth German edition, is brought up to date, and contains much additional matter. Seeing that it contains no fewer than 576 closely-printed pages, and 372 figures, many of which are well printed in colours, it is marvellous that the book has been produced at so low a price, especially when it is borne in mind that the present is an entirely new and re-written treatise, and not merely a reprint of a previous edition, with a few pages added, as is often the case with 'new editions.' To us, the part of the work particularly calling for favourable comment is the carefully prepared and extensive bibliography, occupying pages 497–576. This, on a rough calculation, must contain references to over three thousand works. It is also divided into various sections, *e.g.*, Nervous system (A) Central Nervous System (*a*), Cyclostomi and Pisces, etc. In this way a student can refer at once to all the important monographs dealing with any particular aspect of any particular animal or group of animals. The bibliography alone will make the present volume indispensable to workers.

Evolution of Mammalian Molar Teeth to and from the triangular type, by **Henry Fairfield Osbourn.** Edited by W. K. Gregory. New York: The MacMillan Co., 250 pp., $2.

It will be remembered that some years ago E. D. Cope, the American palæontologist, brought forward the 'tritubercular theory' of the origin of the teeth of mammals—a theory which at first seemed to meet with fairly general acceptance, but eventually there was a strong reaction against certain features of it by many most able anatomists. This we learn 'is partly due to misunderstanding, partly to the fact that all the evidence has never been fully marshalled, partly to the discovery of new embryological and palæontological evidence which may disprove certain features of the theory; but chiefly to the fact that some of the most decisive and convincing palæontological evidence in support of the theory has not been clearly advanced.' Briefly, the general idea may be expressed in the following paragraph :—' If the derivation of the mammalian molar from the single reptilian cone can be demonstrated by the comparison of a series of transitional stages between the single cone and the three-cone type, and from the latter to the central tribubercular type, the separate history of each cone can certainly be traced throughout the series in its various degrees of modification, development, and degeneration. The remarkable part played by the tribubercular molar has been unfolded by the discoveries and writings of Cope. It is undoubtedly the ancestral molar type of the Primates, the Carnivora, the Ungulata, the Cheiroptera, the Insectivora, and of several, if not all, of the Marsupialia.' In the present work the writer endeavours to clear away the misunderstandings, and to marshall all the evidence in a proper manner. Whether he has succeeded or not, it cannot be denied that the volume contains a mass of valuable and suggestive information worthy of the serious thought and study of everyone interested in palæontology or evolution. There are over two hundred clearly-drawn figures, which add much to the value of the work. A useful feature also is a resumé of the opposing views, by Mr W. K. Gregory, and a bibliography.

A Trip to Pilawin, by **R. Lydekker.** London: Rowland Ward, 1908. 115 pp., price 6/- net.

On the invitation of Count Potocki, Mr. R. Lydekker in August 1907 paid a visit to the famous deer park at Pilawin, in the Russian Province of Volhynia. So recently as 1901 Count Potocki decided to found the game preserve, his original intention being to confine it to elk. A visit to the Duke of Bedford's park at Woburn Abbey, however, enlarged the Count's ideas with regard to Pilawin, resulting in wapiti, several species of deer, bison, etc. being introduced, and we find the Count wants to see Pilawin 'not a zoological garden, but a wild forest, where the noblest kinds of game may enjoy the largest possible amount of freedom, and where the sportsman may find the enjoyment of real sport, and the naturalist a great field for study.' Mr. Lydekker's visit has resulted in the appearance of the present volume, in which may be found detailed descriptions of the various animals there to be seen. The book is printed in large type on glazed paper, and is illustrated by numerous excellent blocks from photographs.

Text Book of Zoology, by **H. G. Wells** and **A. M. Davies.** Fourth Edition. London: W. B. Clive, 458 pp., 6/6 net.

The fact that a fourth edition of this well-known text-book has been called for since it was first published ten years ago, speaks for itself. The new edition contains a supplement written and illustrated by Mr. J. T. Cunningham, M.A. It includes a special chapter on the Diagnostic Characters of the principal divisions of the Animal Kingdom; an account of all the additional types of Invertebrates prescribed by the London University; Syllabuses for the Intermediate Sciences and Preliminary Scientific Examinations, as well as a short chapter on the results of recent investigations concerning the structure of the nephridia of Amphioxus, and the general theory of cœlom and nephridia.' The first part of the book deals with the Rabbit; the second, the Lower Vertebrates; the third, the Development of the Vertebrates; and the fourth, the Inverebrates. There are about two hundred illustrations. The volume is well produced, and is a marvel of cheapness.

George A. Fothergill's Sketch-Book. J. Dodds, Darlington. 168 pp., 10/6.

This is a 'pictorial record of the artist's wanderings in search of character, and the humorous and sporting aspect of human nature, bird and animal [!] life, picturesque landscape, and more old signs and sign-boards, and other antiquarian studies.' In the sub-title quoted, one gets a fair idea of the scope of a charming volume which will please the heart of artist or antiquary. Dr. Fothergill, besides being a most capable draughtsman, has the happy knack of sketching just those objects which require and deserve carefully recording, and by publishing his drawings in the form of this sketch-book, he has conferred a favour upon all those who appreciate anything old or artistic. Dr. Fothergill has also an eye for a good horse, and many of his pictures are of great interest to sportsmen. Several of the subjects portrayed occur in the Darlington district, and a perusal of the sketches of old inn-signs, weather-cocks, carved door-heads, fire-places, sun-dials, locks, fanlights, furniture, etc., at once indicates the variety of tastes of the artist. Here and there are sketches of typical Yorkshire scenery—cliff, and moor, and fell; whilst now and then we have evidence of his keen appreciation of humour. There are also several items of natural history interest, which, again, indicate the broad range of the author's tastes. The descriptive letterpress has all the crispness and character of the sketches—both making the volume a most welcome addition to the library or drawing-room.

Peas, by **Horace J. Wright, F.R.H.S.** London: Agricultural and Horticultural Association. Price One Penny.

With this popular garden book, the One and All series reaches No. 15 of this issue. The author deals very thoroughly with his subject, and the editor, Edward Owen Greening, adds illustrations and explanatory notes.

NORTHERN NEWS.

We are sorry to hear of the death of Mr. W. Jerome Harrison, F.G.S. We hope to refer to his work in our next issue.

Some Selbornians have recently had an excursion to St. Albans, and Uncle Westell pointed out the site of the pageant of last year.

We don't know who writes the weather reports for the 'Sheffield Evening Mail,' but the 'Light wine E.N.E.' must surely have been predicted just after lunch.

'A young cuckoo has been found hatched in a hedge-sparrow's nest in the garden of Mr. R. Stather, of Hotham. The curiosity is that the young cuckoo is fed in the nest by a hedge-sparrow.'—*Hull Daily Mail.* The young cuckoo should, of course, have been fed by an elephant.

'For the benefit of readers and ourselves' a certain 'natural history' newspaper has started a shop. Judging from an advertisement, this shop will be principally stocked with books written by the editor, and with 'The — — Hair Wash,' which we hope may not be too penetrating.

At the recent celebrations at the Linnean Society, Lord Avebury stated that Darwin was much beloved at Down, near Beckenham, though he was rather a puzzle to the villagers. His gardener, once being asked how Darwin was, said very sadly: 'I often wish he had something to do!'

Mr. E. P. Butterfield describes the 'purple patch' of his life [seeing the Pied Flycatcher] in the June 'Zoologist.' In the same publication Mr. W. F. Kirby writes on 'the Longevity of Entomologists.' He gives a list of the ages at death of over three hundred entomologists, from which it is evident that, with entomologists at any rate, the good do not die young!

Amongst a number of printed questions placed before the scholars of a well-known educational museum, we notice one is: 'If during *a St. Ledger's* Race the rotatory movement of the earth were suddenly stopped, what would be the effect upon the horses, the spectators, and the town of *Epsom?*' We would suggest that the surprise would be almost as great as if the Derby were to be run at Doncaster!

The 'Evening Standard and St. James's Gazette,' after referring to the destruction of trees in America for supplying wood pulp, adds: 'what the axe and saw-mill spare, the teredos [*sic*] or ship's worm, attacks, laying low whole forests in its malevolent activity.' We had an idea that strange things occurred in America, but we hardly expected to hear that marine molluscs were eating the trees in the forests.

'As a characteristic specimen of the "natural history" pabulum served up weekly in a print exclusively devoted to exploiting this branch of science, it may be put on record that—without note or comment—it published lately an account of a snow-bunting's breeding in Westmorland (which, of course, it spells wrongly—Westmoreland). Now for a record of the snow-goose breeding in Fleet Street!'—*Yorkshire Weekly Post.*

The erosion of our coasts is to be stopped at last! In view of the simple and sure cure referred to in the following letter to the Hull Press, the wonder is that the sea was not mastered long ago:—'There has been much comment and trouble about this serious question, which must be overcome. *The cause is the sea battering at the foot of the cliffs* [!]. The effect is that Old England is going into the sea. The remedy is to trench the top of the beach at the foot of the cliffs, about 3-ft. deep by 12-ft. wide, and then fill up with puddled clay. Batten the bottom of the cliff about 3-ft. thick, the thickness gradually lessening to about 12-ft. high. *This will stop the sea from undermining, and the top of the cliffs will never come down.* If the authorities will try this plan in the worst place on the coast, I feel sure it will stand the test.'

A 'B.E.N.A. Company, Limited' is urged, in order to 'develop' things.

'For exchange:—Marine shells of California for same.'—*The Nautilus.* Then why exchange?

An excellent portrait of the late Sir John Evans appears in 'Man' for July, together with some brief notes by Lord Avebury.

Whilst congratulating Dr. G. A. Auden, of York, upon his important appointment at Birmingham, we cannot but regret that both York and Yorkshire are losing so enthusiastic and painstaking an antiquary.

The Lancashire and Cheshire Entomological Society has issued a valuable list of 'The Coleoptera of Lancashire and Cheshire,' by W. E. Sharp (76 pp.). The list includes 1486 species, or about 45 per cent. of the British list.

Messrs. R. Newstead and T. A. Coward record an example of Schlegel's Petrel in Cheshire—a new European bird, in 'British Birds' for June. In the same publication Mr. H. Noble writes on the usefulness of the accompanying down in connection with the identification of duck's eggs.

'Is the Okapi identical with the "Thahash" of the Jews?' is a question discussed in the July 'Zoologist' by S. M. Perlmann. In the same journal Mr. G. Meade-Waldo gives some notes made during a cruise on the 'Valhalla'; and a Grey Seal, seven feet six inches in length, is recorded in the Mersey. It has been secured for the Warrington Museum.

'The boldest sparrow yet' is the title to the following paragraph from a serio-comic journal:—'A sparrow has been observed at the Temple Station on the London Underground Railway, which hops about between the rails looking for food, and when a train comes, it stops there, and *allows the train to pass over its head.*' A country-side sparrow, surely! A town sparrow's head would have been reduced to pulp.

We are sorry to find that 'Punch' did not take the hint we gave in our last issue. In a subsequent impression there are no fewer than four natural history items, two of which we give:—'"Peacock and hen for sale, unrelated, perfect plumage, 1906 chicks."—*The Countryside.* Then its quite time they *were* related.' '"Dr. Darwin just lived long enough to receive the admiring tributes of the whale community."—*Manchester Evening News.* Very slow these cetaceans to fall into line with others.'

At the recent meeting of the Museums' Association at Ipswich, an interesting address was delivered by Mrs. Roesler on the work of an instructor in the American Museum of Natural History. During her remarks she gave a good story relating to one of the scholars who was gazing in awe at a skeleton of a Brontosaurus, in the Museum, which is sixty feet in length, and is mounted on large iron rods, one of which goes the length of the skeleton. The boy was not able to realize that the skeleton was really an animal denuded of flesh, but considered it to be in its original form. At length he said:—'Teacher, how does it eat?' The reply was quickly forthcoming from another youth:—'Hey, don't you see the pipe?'

'How to tell birds at sight' is the title of a series of illuminating articles now appearing weekly. 'Black with dark grey nape and pale eye'; 'size of blackbird, blackish above, reddish below'; 'size of skylark, but darker back, more slender shape, more undulating flight,' are sample descriptions. Possibly our readers may be able to identify the species from the descriptions given. A reader, who has evidently read these details, gives the author a poser:—'The following is a description of a beautiful [!] bird seen in a town garden in Edinburgh on April 30th [query April 1st]:—'About the size of a sparrow, pink coloured, pale green on back, black patch on breast, black head and white line on top. *Alights on the soil and picks food!!!*'

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T. SHEPPARD, F.G.S., F.S.A.Scot.,
THE MUSEUM, HULL;
AND
T. W. WOODHEAD, Ph.D, .F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
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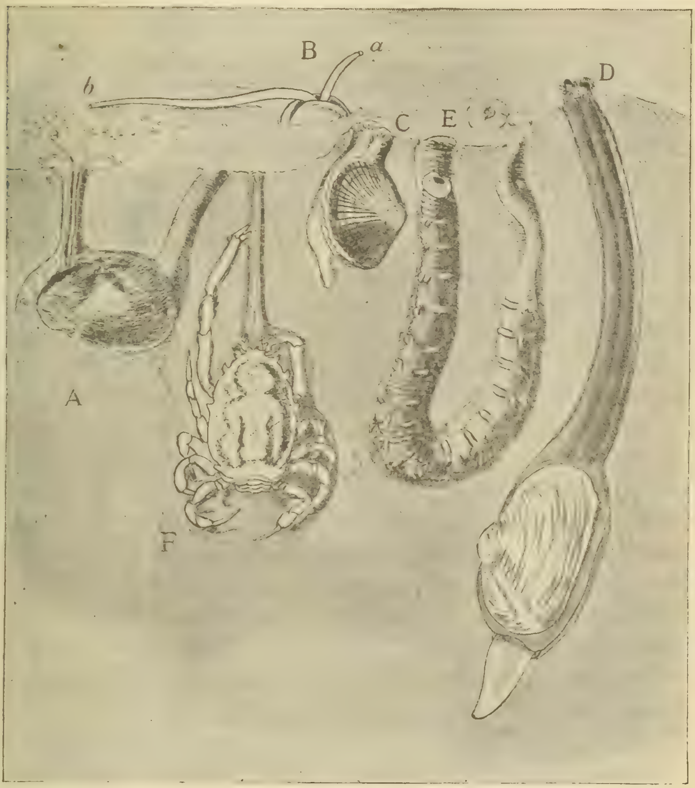
NOTES AND COMMENTS.

BURROWING MARINE ANIMALS.

In Dr. Gamble's useful book on animal life, reviewed in these columns recently, a chapter of particular interest relates to the way in which various marine animals burrow in the sand, etc., for protection, and this is illustrated by a block, which the publishers kindly permit us to reproduce. Fig A represents the Heart-urchin, shewing its tube feet gathering food; B= a bivalve (*Scrobicularia*), shewing the inlet (*b*) for water and food, and the outlet (*a*); C=the Cockle, shewing inhalent and exhalent tubes; D=the Mud-clam (*Mya*), shewing the same; E=the Lugworm; F=the Masked Crab, the antennæ of which form the inhalent tube.



A Group of Burrowing Animals from a sandy shore.

LITTLE LINCOLNSHIRE MEN OF YEARS AGO.

The Rev. A. Hunt has issued a paper dealing with 'The Pygmy Flint Age in Lincolnshire,' which he calls 'a contribution to the ethnology of Lincolnshire,' though it does not appear to contain much ethnology. We have perused it carefully, but have failed to find that any of the objections to the so-called 'pygmy man age,' which have from time to time been raised in these pages, have been met ; and the main evidence in the Rev. A. Hunt's address seems to be his appeal to the authority of the 'great' specialists he quotes, after apparently having viewed them through a microscope. As usual with these pygmy papers, it is illustrated by a photograph of some flakes, at a considerably reduced scale. The 'twenty and thirty different chips,' which occur on half an inch of the edge of a specimen, do not necessarily prove 'extraordinary keen sight in those who made them,' as a blind man could copy them exactly if he simply scraped a sharp flint edge along a piece of wood, such as the 'pygmy men' might often have done in fashioning a bow or straightening an arrow.

THEIR WEAPONS.

Amongst the *proofs* given that the 'pygmy flints' are the work of mankind, we learn that (*a*) the choncoidal [*sic*] fracture runs down the length of the flint, and (*b*) 'the patina or skin, the result of weathering or exposure.' The latter can be found on any flint on the fields, and is no more proof that it is due to human handiwork than are the three-penny pieces, which the author gets in his collection on a Sunday, evidence that his congregation consists of pygmy men and women with pygmy pockets. The theory that 'the Pygmy flints of Scunthorpe are the work of a migrating people, who passed over from India through Asia and Europe to Britain' is nearly as absurd as a previous theory advanced by a 'great specialist,' viz., that these people sailed from India, and came up the Humber in boats.

THEIR CLOTHING,

In dealing with the question 'by what class of people were these implements made,' we get a fair sample of this 'contributions to ethnology.' They are thought to have had *keen vision,* for the reason already given ; they were *clever designers,* because the same shapes of flints are reproduced in hundreds of instances ! For the same reason they were *careful workers,* and because fragments of charcoal have been found on the floors of their dwelling places they *knew how to make a fire.* In this connection we would suggest that one of their dwelling places certainly has not been found in this country, and that the presence of charcoal found on the same layer as the flints is no more proof that both are contemporary than a certain George III. farthing, also found on the same level, is proof that George III. was the pygmy king. In a sandy district such as Scunthorpe, where the surface is constantly changing as a result of the winds, too much reliance must not be placed upon the levels at which objects are found.

THEIR DWELLINGS,

The author believes also that the natural conditions at Scunthorpe were formerly like those obtaining in the Ituri forest in Africa to-day; from which locality, of course, Col. Harrison's pygmies came from. We saw these pygmies, and their spears and other weapons, which were quite as large as those used by other African tribes. We suggested to them (through the interpreter) that they really should only have weapons of flint of an inch or so in length! We shall not soon forget the look of pity which they gave us. We learn from Mr. Hunt that 'the pygmies lived in a warmer atmosphere at Scunthorpe than now exists in England, and that these people lived in communities in mud huts, such as may be seen now among these living survivals of Pygmy people; they were, in fact, Forest Dwellers.' This statement, unsupported by one jot or tittle of evidence, is a fair sample of this 'contribution to ethnology.' The great array of authorities from Herodotus to the Rev. R. A. Gatty, do not supply one piece of evidence of a Scunthorpe Pygmy *race*; that there are 'pygmy flints' some may be prepared to admit. The tallest men in the British Army fire small bullets. And the Rev. A. Hunt's skin is (we hope) proof against pin-pricks.

COLEOPTERA.

***Gracilia minuta* L. at Barnsley.**—A fine specimen of this small Longicorn flew through the open window into an attic of my house on Sunday morning, July 12th. Apart from the occurrence of this somewhat uncommon species, the incident is worthy of note as showing the height attained during a normal flight, there being no flowers of any kind in the attic to attract flower-loving species.—E. G. Bayford, Barnsley.

THE ORIGIN OF BRITISH 'WILD' CATTLE.

H. E. FORREST.

(PLATES XXXII-XXXV.).

FEW, if any, of our British Mammals have been so much discussed as the so-called Wild White Cattle of Chillingham and other Parks. The practical extinction of the celebrated Chartley herd has recently awakened renewed interest in these animals, so that the present seems a fitting occasion for reopening the discussion as to their origin.

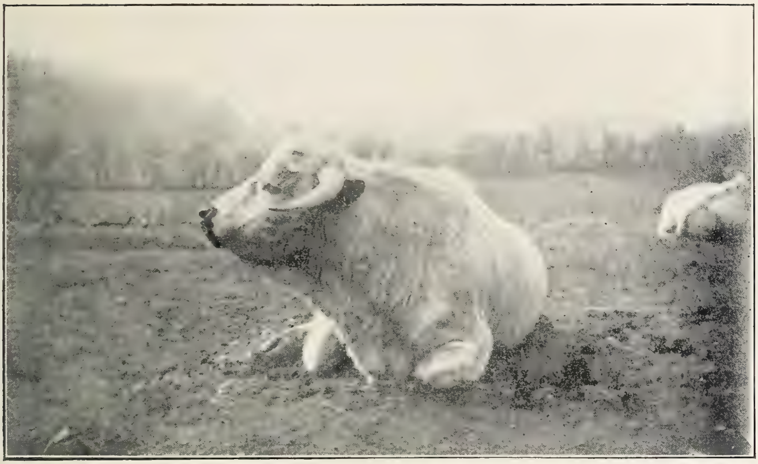
The most exhaustive paper on the subject is that by Mr. R. Hedger Wallace, published in the 'Transactions of the Natural History Society of Glasgow,' 1898. It is well illustrated, and contains a wealth of historic detail, and a copious bibliography.

The older writers were of opinion that our Park Cattle were the descendants of an indigenous wild race, but Mr. Wallace shows that they are the feral descendants of a domesticated race, their peculiar habits being the result of the conditions under which they are kept. This view is accepted generally by modern zoologists, and its truth taken for granted in the present paper.

Most of the parks in which the old-established herds are kept were enclosed about the end of the thirteenth century. Up to that time the animals had been free to roam wherever they willed. So far as is known the majority, at any rate, were white at this period, and it has been assumed that this colour is characteristic of Wild Cattle. The Chillingham herd is white with reddish-brown ears and muzzles; the Chartley herd has black ears and muzzles. All other herds resemble one or other of these in colour. How long had these cattle been white?

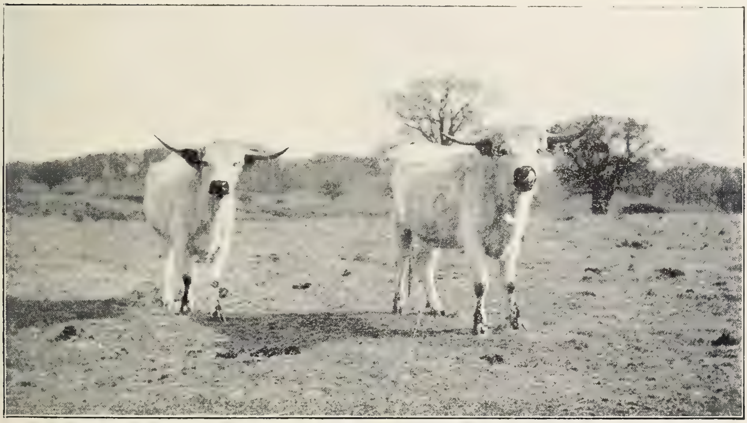
We may dismiss as altogether improbable the idea that the white colour became fixed in a state of nature. The reverse would inevitably happen. White animals, except in snowy weather, would be more conspicuous than dark ones, so, in the struggle for existence, would be more likely to fall victims to their enemies. The general tendency of natural selection would be in the direction of dark colouration. The more white an animal was, the less likely it would be to escape destruction, or to survive long enough to transmit this colour to any progeny.

It is well known that, when domesticated, animals are more



Photo] [*Rev. C. F L. Barnwell.*

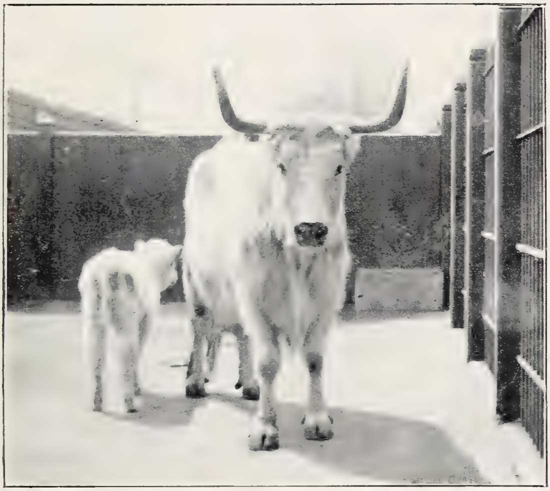
Chartley Bull.



Photo] [*Rev. C. F. L. Barnwell.*

Chartley Heifers.

BRITISH MUSEUM
NATURAL HISTORY



Photo] [*G. Weir Cosens.*

Vaynol Cow and Calf at the 'Zoo.'

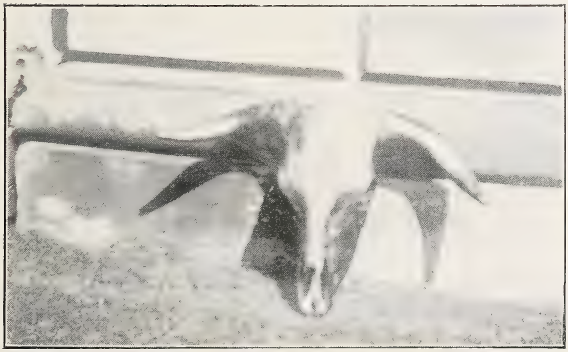
Photo] [*Laisters F. Lort.*

Vaynol Park Cattle.

BRITISH MUSEUM NATURAL HISTORY

Photo] *R. J. Irwin.*

Welsh Black Cattle.

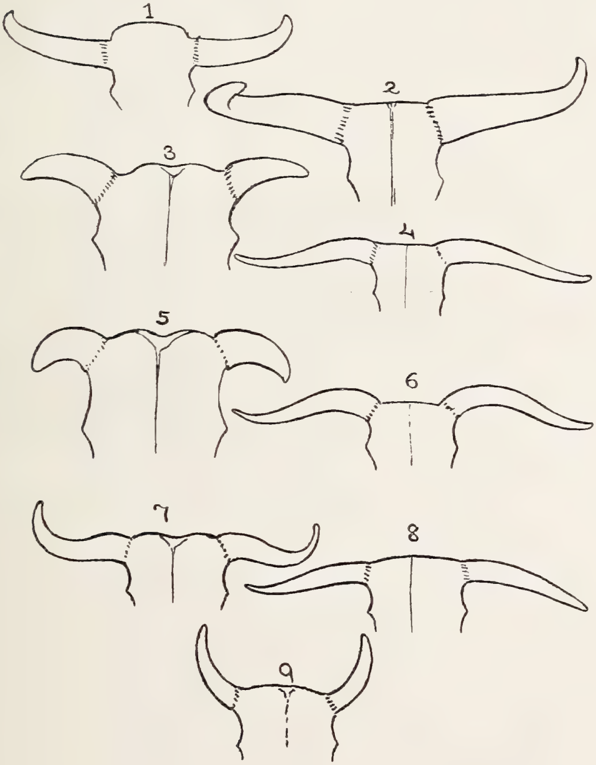


Photo] [*J. Whitaker.*

Skull of Lyme Park Cow.

BRITISH MUSEUM NATURAL HISTORY

SKULLS OF BRITISH CATTLE.



1. *Bos bison.*
2. *Bos primigenius.*
3. *Bos longifrons* (cow).
5. *Bos longifrons* (bull).

4. Chartley bull.
6. Chartley cow.
7. Cadzow bull.
8. Lyme cow.
9. Chillingham bull.

BRITISH MUSEUM NATURAL HISTORY

prone to variation than they are in the wild state—that domestication increases the tendency to variation. This fact has been utilized by man for ages past, and by breeding only from individuals showing the desired character, he has obtained endless varieties from one original stock. The dog and pigeon are notable examples.

Applying this principle to the ox, we may perhaps get a clue to the origin of the White Cattle of our parks. I do not propose to enter into the history of the various herds, as this has been dealt with exhaustively by Storer, Whitaker, and other writers; whilst to do so would not help us, as these cattle were already white when the parks were enclosed five centuries ago, so that their origin must be sought at some earlier period.

Before going further, I would point out that, although the various Park Cattle resemble one another in colour, they differ considerably in other respects. Systematists agree that neither colour nor size are of value in differentiating species; yet, almost with one accord, authors who have written about these animals, have emphasized the similarity in colour, but have overlooked the far more important differences in structure.

It has been assumed that all Park Cattle are descended from one stock. It is the object of this paper to show that they are derived from two stocks—one short-horned, the other long-horned, each form of horn being associated with a special form of skull.

Certain characters were probably common to both the long-horned and short-horned ancient breeds:—

(1) The horns were shorter, thicker, and straighter in the bulls than the cows.

(2) The colour was either red and white, or black and white—sometimes entirely one of these colours.

With regard to the first of these points, it is not difficult to distinguish between the cows and bulls in the semi-fossil skulls found in this country, although authors have rarely attempted to do so.

As to colouration, it must be familiar to everyone that all our domestic breeds of cattle are either red and white or black and white, with an occasional strain of beasts entirely red, black, or white. The only exceptions are the Alderney and kindred breeds, which are fawn-coloured, with dusky points. These, however, are comparatively modern, and the peculiar colouration is due to an admixture of blood from the 'Mauretanian Ox'—a foreign animal. It is impossible to imagine that any of the ancient breeds resembled the Alderney in colour, so it is safe to assume that they were—as stated above—either red and white, or black and white; whilst in both these breeds occasional calves would be dropped which were entirely red, or black, or white.

The sources whence our Park and domestic breeds of oxen were possibly derived may now be considered.

Three species of Ox are recognised as having inhabited Britain in Pleistocene and recent geological times:—

Bos priscus, the European Bison, a humped animal with bony dome between the horns, the latter being of moderate length and slightly curved. Extinct now, except in Poland. (As none of our cattle have a hump on the withers, or a bony dome between the horns, the Bison may be dismissed as an impossible ancestor).

Bos primigenius, the Urus of Cæsar, a gigantic ox with long curved and slightly twisted horns, the bases almost in a straight line with the top of the skull, which in outline is not curved. Extinct in Britain before the Christian era, but survived in Europe till 1627. This is the probable ancestor of all European long-horned oxen, including the Chartley and Lyme herds of Park Cattle.

Bos longifrons, the Celtic Short-horn, a much smaller ox, with short curved horns, and curved ridge between their bases. This curve is in the shape of a Cupid's Bow (⏞), and is more prominent in bulls than in cows. It was domesticated as long ago as Neolithic times; semi-fossil remains are plentiful in Britain and most European countries. The probable ancestor of the older short-horned oxen, including the Kerry Cattle and Scotch Kyloes; also to a great extent of the black Welsh race, and the Chillingham and Cadzow herds, though all these last show an admixture of Long-horn blood—they have the curved frontal ridge of *Bos longifrons*, but the shape of the horns resembles somewhat *B. primigenius*. Polled oxen are also derived from the *longifrons* type as they have the curved frontal ridge strongly developed.

The connection between the shape of the skull and the horns appears to be constant, so that it is most valuable as a clue in tracing the ancestry of the various breeds of cattle; certainly it is more reliable than colour..

In addition to the characters described above, there is a difference in the curve and direction of the horns in *B. primigenius* and *longifrons.* In the former, the horns are produced laterally on a level with the top of the skull for the greater portion of their length, the ends only being turned forwards and upwards. In the latter they are bent downwards obliquely, the ends being turned slightly forwards. In the cows the horns project laterally more than in the bulls, and the ends are more turned forwards.

The Chillingham Cattle resemble *B. primigenius* in form of skull, but differ widely from that type in shape of horns: these are rather short, and are curved *upwards* throughout their whole length.

I have seen skulls in museums attributed to *B. longifrons,* in which the horns have a distinct upward bend; these are certainly not pure *longifrons,* but show a cross with the Roman long-horn, so are of later date than the Roman occupation of Britain.

None of the breeds of more recent date can be considered as belonging purely to either the *primigenius* or *longifrons* type, unless it be the Kerry Cattle of Ireland, and the Kyloes of the Scotch Highlands—both exhibiting such striking resemblances to the latter type that they may be regarded as specifically identical.

But few writers have noticed, and none have emphasized the fact, that our White Park Cattle are not all of the same type—some are short-horns, others long-horns, and a comparison of their skulls shows that in the long-horned breeds (*e.g.,* Chartley), the top of the skull is straight as in *B. primigenius,* but in the short-horned herds (*e.g.,* Cadzow), it is curved as in *B. longifrons.* The Cadzow and Chillingham cattle, however, only partially show this character, because they are not pure bred from the *longifrons* stock—they have evidently got long-horn blood in them, as shown by the length and shape of horns, and the comparatively slight curve of the frontal ridge.

Whilst I do not regard the type *longifrons* as being synonymous with 'Short-horn,' nor *primigenius* with 'Long-horn,' I find that in a general sense most Short-horns in skull and horns resemble most nearly the former type, most long-horns the latter.

Of course, in modern cattle every conceivable intermediate form is to be found. In the black cattle of Wales, for example, I have seen in the same herd animals typical of both types,* and with horns and skulls of endless variety between the two extremes; still, on the whole, one would have no difficulty in deciding that the prevailing type was *longifrons*, but with horns like Cadzow cattle, due to an admixture of Long-horn blood.

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* This is well shown in the photograph.

There is strong presumptive evidence that all the earlier breeds of short-horns are mainly descendants of *longifrons*, and that the long-horned breeds are descendants of *primigenius*, though the latter only indirectly, by the introduction of some long-horned oxen from the continent. That is to say, *Bos primigenius* was never domesticated in England; it only existed here as a wild animal, and was exterminated before the Christian era.

It is practically certain that at the period of the Roman invasion, the British had only one domestic ox—*Bos longifrons*. The Romans had a domesticated long-horn ox, larger than *longifrons*, but smaller than *primigenius*. Of this breed they had dark-coloured beasts, used for draught, and white oxen, used for sacrifices to their gods; upon these last they placed a high value.

Professor Boyd Dawkins is of opinion that the domesticated long-horned oxen were introduced to Britain not by the Romans, but by the Northmen, and this view is supported by the fact that at Uriconium all the remains of oxen belong to the short-horned *longifrons*. The exact period of their introduction is of little moment. One thing is certain, that until the long-horned domestic ox was introduced from Europe, there was only one breed of domestic ox in this country, the short-horned *longifrons*, which at that time was almost certainly dark-coloured.

How either of these races of domesticated oxen originated is not known, but the Celtic short-horn is found associated everywhere with remains of Neolithic man, so was evidently domesticated long ages ago. It was probably a stunted race of *B. primigenius* which, being first dwarfed by unfavourable environment, was more easily subjugated by man, and readily submitted to domestication.

(*To be continued*).

◆

Beverley is to have its local museum.

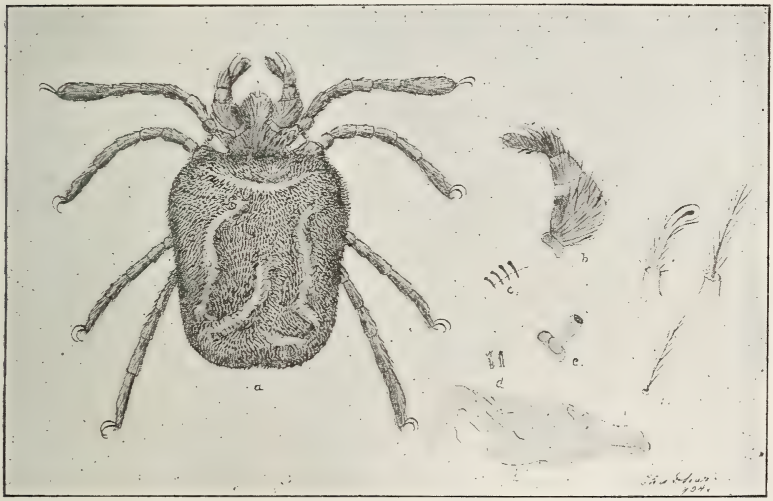
In discussing the origin of the name of 'the plainest of animals, with a skin that doesn't fit,' a visitor to a museum was heard to explain that it is '*Rhind*, 'cos he 'as a rhind; *os*, 'cos he is a 'oss, in a way; and *serious*, 'cos he's mentioned in the Bible.'

SOME BRITISH EARTHMITES.

(*Trombidiidae.*)

C. F. GEORGE,
Kirton-in-Lindsey.

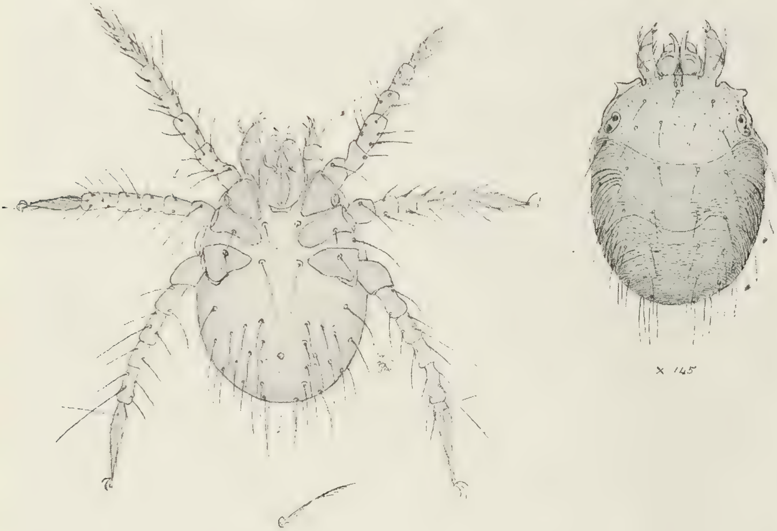
THIS family contains some of the most beautiful microscopic creatures we possess. Of these, the type, *Trombidium holosericeum* is the largest, most common, and perhaps the handsomest of our Earth mites. It is found not infrequently in our gardens in the Spring, especially during May. Its fine scarlet colour makes it very conspicuous, especially when the sun shines upon it, it glitters from the peculiar structure of its hairs or papillæ, which give it the appearance of silk velvet, hence its name ‘ holosericeum ’ (entirely of silk). It has been observed and recorded by very eminent naturalists from Martin Lister, in 1678, to the present time. Professor Sig Thor of Christiania in his pamphlet on ‘ Norges Trombidiidæ,’ 1900, gives



Trombidium holosericeum.

a Dorsal surface. Length 2.80 mm. Breadth 2.40 mm.
b Palpi x 45.
c Hairs from a mounted specimen.
d ,, ,, an unmounted specimen.
e Eye x 22. Dorsal surface.
f Hairs from Posterior portion on Dorsal surface.
g ,, ,, Anterior ,, ,, ,, ,,
h ,, ,, Palpi.
Length of Mandible 0.56 mm.

a list of forty-seven works on Natural History in which it is mentioned. Though the largest of our British species, there exist several foreign ones much larger, which may be considered to be the giants of the family. I have not yet had the pleasure of seeing one of these alive, but I possess a mounted specimen; I do not know its specific name, or native place; it must be very handsome when alive. A glance at Mr. Soar's characteristic drawing will shew that the mite may be divided into two portions, an anterior one carrying the proboscis, palpi, eyes, and two front pairs of legs; and a posterior one, carrying the two pairs of hind legs, and the genital and anal apertures.



Larval Trombidium.

In the centre of the front portion of the mite, the mandibles are seen to project slightly. These organs are paired, and are most important, because by their anatomy they differentiate the Trombidiidæ from the Rhyncholophidæ. Fig. i represents one of these organs highly magnified; it consists first of a claw-like portion 'the blade,' and second, the handle or maunbrium, and is described as sickle-formed. On each side of the proboscis are the palpi, one of which is figured at *b*, and is seen to consist of five joints. The first, which attaches it to the body, is the smallest; the second, much the largest, is somewhat quadrangular; the third, a truncated cone; the fourth ends in a strong claw; the fifth springs from the base of the fourth, and is bag shaped, the whole organ is very hairy. Figure *h* represents one of these compound hairs. Mr. Soar gives the length of the whole organ as about 0.56 mm.

The eyes are two in number, and very peculiar. Figure *e* shews one of them detached, and enlarged. They are petiolated, and have two ocelli on the distal end, only one of which is shewn in the figure. The legs are all rather short, the front ones being slightly the longest, and their terminal joint is somewhat club shaped; the end joint of each leg is provided with two large and powerful claws. The posterior part or body of the mite is almost square in outline, a little longer than broad, with the angles rounded; the front border is almost straight, and rather longer than the back one, which is also slightly emarginate in the centre. The back is rather flat, and wrinkled more or less. These wrinkles are not uniform, but can be varied by the creature during life. The skin is thickly covered with hairs or papillæ of a beautiful and complicated structure, and of two or three distinct patterns, those on the dorsum and outer edges are more or less clubbed at their extremity, and, as a rule, more or less curved, see figure *f*. They are also finely pectinated, and spring from a short tubular process. Figure *c* represents these hairs less highly magnified, and drawn from a Balsam mounted specimen, whilst *d* is drawn from similar hairs dry, and not mounted in any medium, the pectination of their stalks being more distinctly seen. Figure *g* represents the hairs or papillæ from the front, and under part of the body. These hairs will repay careful examination with a microscope power of ⅛ inch. The genital aperture is longer than the anal, and is provided with six copulatory discs within the aperture, three on each side. Every portion of the mite deserves careful examination under the microscope, and several interesting slides may be obtained by its dissection. Professional mounters sometimes prepare the creature entire, but such slides (though beautiful and not without their use) are apt to give a wrong impression of the creature, because the pressure used distorts and misplaces the different organs. Perhaps where only a single slide is desired, the easiest and most useful plan is (after the mite has been killed and kept in preservative solution for a few days), to divide it into two portions with a lancet or small, sharp knife, the anterior part to carry the two first pair of legs and other organs, and the posterior, the two last pair of legs, and the genital and anal openings. Then carefully squeeze out of each segment its internal* contents, wash carefully to get rid of the preservation, then digest for an hour or two, first in weak spirit and water, then in stronger spirit, then in rectified spirit or absolute alcohol, and lastly in oil of cloves, until the whole is clear and transparent; finally mounting in Canada Balsam thinned with Benzole—using little or no pressure. The result will be an useful and beautiful slide, and therefore a joy for ever!

With regard to the life history of these mites, more investigations and records are desirable. We know that they deposit eggs, and that these eggs produce six-legged larvæ, which are very active, and in this stage parasitic; the human subject not being free from their attacks, as shewn by the number of 'Punch' for September 18th, 1907, page 215, where there is a striking and amusing picture of the result of visiting a harvest-field by a party of ladies and gentlemen. These larvæ are very small, and of a bright red colour. A lady friend of mine residing in Gloucestershire kindly furnished me with some good specimens last year, and Mr. Soar has favoured me with a good figure from one of these specimens, which speaks for itself.

These mites appear to be fairly common, not only in England, but all over the Continent.

BIRDS.

Bird Notes from York District.—January 3rd—Large flock of Golden Plover in Clifton Ings; January 24th—Large flock of Bramblings near York; January 30th—A White Fronted Goose shot at Earl Cottingwith; January 31st—A white variety ♂ of the common Wild Duck shot on the Malton Road, near York; March 17th—Eight Hawfinches seen together; April 29th—Cuckoo first seen; April 30th—Swallow first seen at Wigginton; May 2nd—Wheatear and Yellow Wagtail at Heworth; May 6th—Willow Wren first seen; May 8th—House Martins and Whitethroat first seen; May 9th—Swifts first seen; Grasshopper Warbler and Landrail heard; May 16th—Sedgewarblers and Whinchats arrived. The season is very late, and all migratory species are much later in arriving than even last year.—SYDNEY SMITH, York.

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* The fact that 'Punch' is quoted in this note probably accounts for the compositor originally setting this word up as 'infernal.'—EDS.

A TRIO OF BRITISH AND ALIEN PLANT-LISTS.

F. ARNOLD LEES, M.R.C.S., Etc.

(*Continued from page 319*).

I will not expertise upon the various new *patres* whose names follow the specific titles: they follow accredited procedure, although it does seem strange to see 'Centaurium pulchellum, *Druce*' or 'C. capitatum, *Rendle* and *Britten*,' put out of remembrance *Fries* and *Willdenow*—the 'Fathers'—because the earlier genus of Hill (1756) in place of the much more familiar *Erythræa*, Borck (1796) has to be adopted. One does not mourn the loss of *Epipactis*, 'inchoate' (Druce) albeit *Helleborine* in its stead has a sort of un-genetic euphony about its termination. But I am not a sufficiently adept nomenclator to venture upon a critical analysis of the names—in time students will get used to them. It is really of but trifling moment that my own name has dropped out through the incidence of some rule, in one case: my differentiated and dubbed 'uncinata,' of 1887 (Bot. Rec. Club Rep. for 1884-6, p. 123), a variety of *Rosa mollissima*, Willd. (*tomentosa*, Sm.) is duly entered as such in the Oxford List, but in London Catalogue, 10th Edn. it appears as a *species*—'586 uncinata, Ley. 18.' *Per contra*, I am naturally pleased to see that 'view' as to distinctiveness has permitted my commemoration of J. G. Baker, *doyen* and best beloved of Yorkshire botanists, to stand as another memento—if one were needed—of connexions, unbroken through half a century, with the county of broad acres. *Carex Leesii*, Ridley (1696 b.) of London Catalogue, 9th Edn., my 'saxumbra' of the Yorkshire Naturalists' Union *Transactions* of 1880, from the tree-shaded rocks at Plumpton, has had to hide its bracteate folly—and properly so, under an earlier designation longebracteata, *Lange* (1805 b.) in the new 10th Edn. The Oxford List concurs, so it is all right—two simultaneous burials cannot but satisfy by their unanimity those left to tell the tale! Why *Eriophorum latifolium*, Hoppe, has become *Eriophorum paniculatum*, Druce, I do not know, if upon no *lucus a non lucendo* ground; this Cottongrass being no more panicled than broadleaved, save in a relative sense. There are many other interments, shewing how fiercely the field has been contested, how many the 'tries' counting towards that goal of finality in nomenclature for which Science is making.

Leaving 'Words,' one may most profitably get to *things*, and take both Catalogues together, as regards the New entries of Species, discovered or described since 1894. To enumerate all would take up too much space; but the more noteworthy, and especially those to be kept in mind when a-field, because Manual definitions are not readily available, are as follows:—*Ranunculus scoticus*, E. S. Marshall; *Fumaria occidentalis*, Pugsley; *Lepidium bonariense*, L. (*lacerum*, Meyer ?) (Oxford List) (Yorks.); *Dianthus gallicus*, Pers. (*arenarius*, Tho.); *Capnoides cava*, Moench (Oxford List); *Impatiens glandulifera*, Royle; *Lupinus nootkatensis*, Donn.; *Erodium cygnorum*, Nees, (Yorks.); *Coronilla varia*, L. (Yorks.); *Fragaria chiloensis*, Duchesne—the cult. strawberry (mostly); *Saxifraga Farreri*, Druce (Oxford List, Ingleboro, Yorks.)—a natural Hybrid between *S. hypnoides* and *S. tridactylites*—discovered by our Yorkshire traveller Reginald A. Farrer, Esq., of Ingleboro' Hall. *Cotoneaster microphylla*, Wall. (Yorks.); *Saxifraga Geum* × *umbrosa* (Ireland).; *Saxifraga rosacea*, Moench; *Epilobium nummularifolium*, R. Cunningham, Yorks. (among other counties), a New Zealand species, of recent introduction either with seeds or in wrappers around roots of some of the fashionable shrubby Zealandic Veronicas, *Hectori*, or *salicornioides*. It grows as an increasing weed in the nursery quad borders, where Veronicas were raised, of Elmet Hall, Roundhay. Interesting because altho' an Alien to-day, and as such undesirable if it became a pest, it is rapidly colonising and trying to become one of the rank and file of British weeds. It is, however, only a small species, four to eight inches in height, repent in habit, the two to three inch flower-and-pod stalks standing up at right angles to the creeping, rooting stem which is beset with opposite leaves in aspect like those of *Anagallis tenella*. Pod one inch, petals pale lilacy white. Its correct designation, however, may prove to be *linnæoides*, Hook. fil. of *Flora Antarctica*. *Œnothera Lamarkiana*, Seringe (vastly on the spread over the Lancashire littoral). *Inula britannica*, L. (Leicester and Yorkshire—Wilstrop, etc., earlier remarked upon). *Artemisia stelleriana*, Bess. *Senecio Cineraria*, D.C. *Hieracium Auricula*, L. *Hier. Ogweni*, Linton, and several other Lintonian 'species' *in esse*, if I may venture the 'querulity.'

Taraxacum spectabile, Dahlst.—the Shetland form of our paludal dandelion, raised to specific rank, 1074 in *London Catalogue,* 1646,c in Oxford List. *Ledum palustre,* L.—' N. W. Ireland, never confirmed ' (Hooker), an occidental Boreal which, if indigenous in N. W. Scotland, may be one of our most Ancient Species, a palæarctic type nigh extinction. *Limonium* (*Statice*) *lychnidifolium,* var. *corymbosum,* Salmon. *Lysimachia quadrifolia* N. (trifolia), which occurs near Meaux, E. Yorks., and calls for investigation this season (Oxford List). *Veronica peregrina,* L. *V. repens* D.C. (York and two other counties). Euphrasias—*Vigursii,* Davey, *Kerneri,* Wettst., *Scottica,* Wett, *occidentalis,* Wett., *latifolia,* Pursh, and *Salisburgensis,* Funck. ; but the writer himself does not funk declaring his belief in the unwisdom of representing these as verspecies, stable and standing apart. To so represent them tends to destroy a standard (which, however ill-definable with exactitude, is in one's mind when one thinks of—(say)—our four Melampryums, all nearly allied yet obviously distinct) and by making ' *values* ' differ, befogs not clears, our conceptions, which, where we have them at all about a thingen—are lightning-quick. The genus *Rhinanthus* is in like case, due, possibly, to evolutionary unfinishedness, if the rife readiness to hybridise which Euphrasias shew be not of itself a suspicious fact—altho' *Rhinanthus* presents some special difficulties.

Euphrasis can accommodate themselves to various ' Associations ' and soils—*Rhinanthus* not nearly to the same extent. Up to 1895 Britain was supposed to harbour but two ' species '—*major* and *minor* of Ehrhart. For this hardy, boreal, rootcrafty Colonist, L.C. 10th Edn. now gives six new names, as equal each one to the others. How this can be, must be left to somebody else to demonstrate in the face of the fact that all the forms are somewhat erratic-ephemeral possessors (and *exhausters*) of their soil sites and companions ; those sites, again, largely in some stage of hominal disturbance, ' reclamation,' etc. After their innings on virgin (more or less) soil, they are known to gradually twinkle out—ever ' freaks ' of a sort. One of the L. C.'s new ones, *Rhinanthus grœnlandicus,* Chabert, is not given at all by Mr. Druce in the Oxford List.

A new Orobanche—*Ritro,* var. *hypochœroides,* Beck, appears as for ' C '—Druce connoting Jersey,—but the doubtful *Orob.* ' *arenaria* ' still precedes *purpurea,* Jacq., although it is altogether ' Non Est ' in the Oxford List. To continue : *Pinguicula vulgaris,* var. *bicolor,* Nordstedt, is as welcome as well-marked an addition. Druce adds a second form, *alpicola*, Rchb., as of Rosshire, which I do not know ; but all these and other minor corollaries and agri-annotations only go to further ram home a gratifying conclusion : that North Britain, has been, and is being worthily and capably investigated at last. That it comes half a century too late some lack and gap in *results* lead one to more than suspect. Still since Grant began with the Wick coast, and the now-dropped *Carex* '*Kattegatensis*' was exploited, valuable additions to our knowledge have been made.

Our ordinal retailment of 'News' brings us now to the Mints. This vegetating suckerous unprolific family has not increased in synonymy, and its list and pedigree in the Tenth Edition offers a pleasing foil to that of the Eye-brights. Four or five, hitherto called 'species.' are indicated to be—what they are—even the common 'unwashed' *sativa*—the result of one cross, or successive crossings between the *arvensis* of the field, the *aquatica* of the water, and the savoury foreign jade brought over by one or other of our old-time Conquerors. So we appear to have taken correctly the measure of the Mints ; or is it that they have stopped 'character' growing ? Have not 'nations' of men and women been made up in a somewhat like way ?

Stachys alpina, L. (Gloster) ; *Salvia Marquandii*, Druce ; *Prunella laciniata*, L. ; *Salicornia lignosa*, Woods ; *Corispermum hyssopifolium*, L. (Yorks.) ; *Euphorbia salicifolia*, Host. (Yorks.) ; *Helleborine atroviridis*, W. R. Linton. *Orchis ericetorum*, E. F. Linton (Yorkshire—moory ground, a slenderer plant than *maculata*, with folded carinate leaves, pale flowers, with the rounded lower lip fanned out, its middle lobe smaller and shorter than the oblique lateral lobes ; easy to differentiate when growing). *Orchis cruenta*, Mueller (Cumberland, but keep in view, as it is intermediate between *latifolia* and *incarnata* and likely to occur in N.W. Yorks.). *Sisyrinchium californicum*, Ait. (S.E. Ireland) ; *Scilla Non-Scripta* L. var. *bracteata*, Druce (Edlington Wood, *Corbett !*) ; *Juncoides* (Luzula) *pallescens*, Bess. (Hants.). To the Pondweeds there are few additions, though several new names, but ten Hybrids are indicated, mainly betwixt *gramineus* L. (*heterophyllus*), *alpinus* (*rufescens*), *lucens* (*Zizii*), and *crispus*, *i.e.*, the heterophylline groups. The discovery of the first alien pondweed (*P. gramineus*, L. Asa Gray, var. *Americanus* (*Claytonii*, Tuck), which Mr. Bennett identified with *P. pensylvanicus*, Chamisso, from the warm water condensing-dam of a cotton-mill below Halifax) appears not to have been made in time to be included in the London Catalogue. The cotton-brought waif is welcome to Yorkshire waterways, along which it will doubtless spread, if not anacharistically. *Eriophorum angustifolium,* has a new var., *triquetrum,* Fr. added; but the genus *Carex* is not greatly altered. *C. ligerica,* Gay is deleted as dubious, a new var. *remota,* Marss (1770,b.) taking the place of 1661,b. in the 9th Edn. The Druce List, however, includes it with his 'angle-bracket' sign of doubtful-ascription affixed. The 'new names' are *C. chordorhiza,* L. *fil*—his first appearance in the British arena apparently. *C. spiculosa,* Fr. var. *hebridensis,* A. Bennett, represents a species with only one station as yet known. *C. frigida* of the 9th Edn. drops out: Sadler's plant so determined for a while being considered by Linton to be alp-modified *binervis* and so dubbed '*Sadleri*' (1819, b.). *Carex inflata* × *riparia* (*Beckmanniana,* Figg.) is given in Oxford List, *sub* 2564, but is wanting in L. C. 10th. Among the Gramineæ are a dozen Additions, viz: *Agrostis verticillata,* Vill (Sarnian, and 'Wool' Alien), *A. scabra,* Willd. (Oxford List); *Phalaris minor,* Retz.; *Milium vernale,* Bieb. (*scabrum,* Merl.), Sarnian too; *Koeleria vallesiana,* Asch., and *K. britannica,* Domin (O. L.); *Glyceria festuciformis,* Heyn. (N.E. Irish littoral, and ballast alien!); *Festuca unilateralis* (*F. ciliata, Danthonii maritima,* L.), which assurged so strangely by roadsides on arid Cornbrash about Carlby in S. Lincoln a few years back; *Poa cenisia,* All. b. *flexuosa,* Wahl, queried '1' vice-county as if *incerte; Glyceria Foucaudii,* Hackel, perhaps another species-in-making, or a split off *G. maritima;* like *Festuca dumetorum,* L. (given for Skegness, Linc., Hackel *in litt,* Oxford List, No. 2786) is off *Festuca rubra,* but which the 10th Edn. omits to place at all; *Agropyron cristatum,* Gaertn. (wool-alien, Yorks!) in the Druce Catalogue only; and, in like case, the Loliums, *L. siculum,* Parl and *L. rigidum,* Gaud., not so very infrequent along with *Lepturus incurvus,* L. (also wanting in 10th Ed. list), where fleeces have been lime-treated, and the scourings cast out: all three are strange-looking livid and rigid-stalked grasses. The only really new Fern is the No. 2026, London Catalogue, *not* in Oxford List—*Botrychium lanceolatum,* Angström, about which I have no information.

What more that may be of use to Yorkshire field botanists? Three inclusions of Mr. Druce's have local applications—five,

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maybe. *Agrimonia Eupatoria* var. *sepium*, Bréb. is a tall-growing somewhat glandulose race affecting bushy places on rich sandy soils, which, though single nutted in the burr fruit, is liable to be mistaken for *A. odorata*. We have either it *or* true *odorata* in the Skirethorns and Sedbergh areas—both quite possibly. *Eupatorium cannabinum*, var. *indivisum*, D.C. (?) with a nearly entire leaf has occurred to Mr. P. F. Lee, near Dewsbury. *Myosotis dissitiflora*, Baker, a bright-blue scattered flowered forget-me-not, perhaps hailing from Switzerland, but much horticultivated of late, is being sown in 'wild' pleasaunces, and may well confound collectors in cloughs and by water below gardens. It does not branch and straggle, so much at a late stage as *M. silvatica*—young, its corollas tend towards emargination of the divisions and so acquire a starry appearance. It were well also to know that there is a squat *parviflora*, Meyer—form or variety of *M. silvatica*, the colour less turquoise, more concentrated (as if by reason of the smaller area to dye), and the hooked hairs on the calyx less numerous (lower structural development ?), which is liable to be confused with the Ben Lawers' *M. pyrenaica*, Pourr. (rupicola, E. B. alpestris, S.) that, recorded for the limestone talus of Micklefell by Backhouse in the Fifties of last century, has never been gathered, and verified as to name for many, many years: indeed, I have never seen specimens assertedly gathered in Yorkshire, and fear a pilgrimage to the Lunedale Shrine would end in disillusion. *Erinus alpinus*, L., as Bentham stated in the last edition of his *Handbook*, too, is naturalised and persistent on the line of the Roman Wall, north of Clitheroe, about Rimington; was seen on rocks by the railside in 1890, and this year in plenty by Pickard, yet it finds no place in the new *London Catalogue*. Of course, it may be said Estrays or Bird-sown Foreigners from our shrubberies, are alike of no moment; but they are important in one sense: from the first, floras have been built up by all sorts of natural accidents, they all had to have a beginning, and find their *nidus* and chance of continuing existence. The successes differ only in a point of age: why not recognise an acclimatised Jew as well as a Gentile ?

Some needed substitutions of Name—as to fact—have been made in these catalogues apart from the 'priority' principle. *Lycium 'barbarum'*—(the thorny Africander) becomes *L. chinense* of Miller, of garden-dictionary fame, who described the English denizen, which is unarmed: its common name 'Tea Tree' points its aborigin—'far Cathay.' *Rosa* '*rubiginosa*' sinks before the practically-contemporaneous *R. Eglanteria*, the sweetbriar so very aptly and universally known as the Eglantine. This should be the immortal Linné's Crown of Thorns, seeing how successfully sentiment and the poets have made current the coin he minted. A last example, the well-established 'monkey-flower,' hardy, and everywhere in the York dales increasing through water-carriage, which has hitherto borne unchallenged the title *Mimulus luteus*, Linn, now appears unanimously in our three Lists as *M. Langsdorfii*, Donn ex Sims, Botan. Magaz., tab. 1501 (1812), as the Linnean *luteus* was an aggregate name including other North American sub-species not from Oregon; Druce gives 'Unalaska' as its aboriginal country.

Omissions from *both* of the lists are surprisingly few; although probably every season's *flora trove*, from the woollen mill 'tips' of Calder Vale to the malting kiln rejectamenta yards of Mirfield, Selby and Leeds, would yield another or two. Just as an example—not a full list, I will, to finish up with, give a score or so of those species missed by Druce or Dunn. Some of them are in print in the Halifax Flora of 1904, others I have knowledge of myself for Yorkshire. *Tetracme quadricornis*, Bunge, the slug-horn podded Cress; *Arenaria stellarioides*, Willd. (Stellaria Arenaria, L.); *Cousinia tenella*, Fisch and Mey, Halifax, '90–'93; but this perhaps connotes the Moroccan *Amberboi*, 344 of Druce's *List; Scabiosa succisa* × *Columbaria* (Derbyshire). *Viburnum lantanoides*, Mhx, the Hobble-bush of New England, often planted, spreading by self 'layering' as *Clematis* or *Ribes* will do, and several times reported as the south-native *V. Lantana*, which it is very like in facies, tho' not so mealy, but it may be told from, by the clothing of the leaf veins underside, the stalks, etc., with tufts of scurfy rust-colored down. *Pernettya mucronata*, Gaudich., bird-sown in a rough heathy field in Crimsworth Dene, Caldervale (Flo. Halifax, App.). *Volvulus sepium*, var. *incarnata*—often cultivated, and once out-cast, making good its footing anywhere. *Arnebia echioides*, D.C. (a yellow flowered borragine). *Veronica digitata, Vahl*—a grain alien. *Plantago tenuiflora*, Waldst. (Wool alien). *Listera ovata, f. quadrifolia*, mihi, (published in 'Naturalist,' Feb. 1894); and Carex brizoides, L. (Fountains Abbey! *Lees Herb.* at Bradford—whatever its grade of citizenship may be). One marvels that the lapses are not more numerous.

On both hands, then, educational and practical, even as an 'Exchanges' List tending to precision of Label, the *Oxford List* will serve a purpose best. At first sight deterrent by reason of its complex contents, the more students of the items of our present-day flora grow familiar with it, the better they will appreciate at its sterling value what Oxford, through its distinguished citizen, has put into the Clarendon Press mould, for the edification of the 'Simplist,' as in Doctor Martin-Lister's time popular parlance called 'the likes of him' and ourselves !

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We have received the **Proceedings of the Liverpool Naturalists' Field Club for 1907,** which contains an account of the club's work during the year. There is an appreciative 'In Memoriam' notice of the late Emily M. Wood (with portrait), detailed reports of the field meetings (which are almost entirely botanical), and the Presidential address of Mr. Robert Newstead, entitled 'Insects as Carriers of Disease.' This was delivered on January 31st, of the current year, so that 'for the year 1907' hardly seems to be accurate.

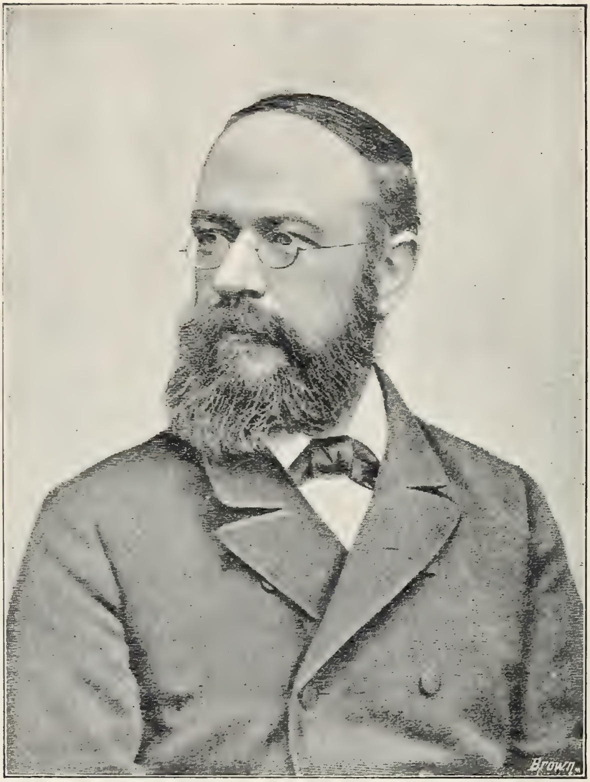
The Annual Report and Transactions of the North Staffordshire Field Club for 1907-8 has been issued under the editorship of Mr. W. Wells Bladen. It is a substantial volume, and besides the various annual reports, and several archæological papers, has notes on Staffordshire Bats, Notes on the Habits of the Common Lizard and Blind-worm, and the Influence of Plant Life on Art, the last-named being the Presidential Address of Mr. W. D. Spanton.

The Thirty-seventh Annual Report and Proceedings of the Chester Society of Natural History, Science and Art for 1907-8 is to hand, and gives evidence of a good year's work. Two legacies are acknowledged, the first consisting of a valuable microscope, telescope, microscope slides and material, books, etc., bequeathed by the late Dr. Stolterfoth ; and £250 from the late John Eyton Williams. The Museum has been largely used by the schools, and we are glad to learn that the negotiations for the transfer of the museum to the Corporation are nearly complete. The society has a membership of 1042, which speaks very well indeed for the interest taken in scientific matters in Cheshire. The Report is worthy of being printed on better paper, and in larger type. We don't know any octavo publication that contains as much matter as appears on page 2 or on page 24 of this Report—in fact, on these there is not even room for the page-number !

Nature Rambles in London, by **K. M. Hall.** London : Hodder & Stoughton. 325 pp., 3/6 net.

Those who are familiar with Miss Hall's excellent work at the Stepney Museum will be prepared for a carefully written and useful book, and will not be disappointed. In 'Nature Rambles in London' Miss Hall demonstrates that there is much to be gleaned in the centre of the busiest city in the world. The hundred fine photographs of animal and plant life indicate full well how much there is to be seen even in the most unexpected quarters. As appendices we find—Lists of the trees and shrubs in the Victoria Park ; and Trees in Battersea Park. There is also a table of the various trees to be seen in nineteen of the London parks, which is a very formidable list indeed. Particulars are likewise given of the relative frequency of the various species.

NATURAL HISTORY



W. Jerome Harrison

In Memoriam.

W. JEROME HARRISON, F.G.S.,
1845-1908.

(PLATE XXXVI.)

QUITE recently we had occasion to deplore the loss of many prominent scientific men. And now we regret to have to add a further name to the list. As in each of the other instances, also, it will be exceedingly difficult to find anyone to carry on his work. We refer to Mr. W. Jerome Harrison, F.G.S., who, on the 6th of June, died at Birmingham, his home for the last twenty-eight years. His death was quite sudden and unexpected.

The last time I saw him was at the Leicester meeting of the British Association, a year ago, when I spent two or three pleasant days in his company, and had the privilege of being conducted round the Leicester Museum, where between 1872 and 1880 he was the Curator. At the Leicester meeting he opened a discussion at the Conference of Delegates from the Corresponding Societies, as to the advisability of forming a National Photographic Survey of objects of natural history, geological and archæological interest—a subject upon which his wide experience entitled him to speak with some authority. A Committee is considering the suggestions he made, and doubtless much good will result; the pity is that his valuable knowledge will no longer be at the Committee's service.

Whilst Mr. Jerome Harrison's tastes were very varied, and the work he accomplished in so many directions was of a most substantial character, he will probably best be remembered for the extraordinarily complete compilations which he prepared for the benefit of geological and archæological students. He had a perfect mania for bibliography—a necessary and exceedingly useful work, but one which very few care to undertake. Having had some little experience in this kind of work, I can speak, as few can, of the enormous labour that Mr. Harrison undertook in preparing his lists. And though I have probably made as much use of them as has anyone else, I must say that on the many occasions upon which I checked his list for a rare item, (which, I must admit I almost hoped he had overlooked), I found it duly included. Perhaps the most important of these lists are 'A Bibliography of Midland Glaciology,' published in 1895, which contained references to over 250 items, with summaries of their contents; and 'A Bibliography of Norfolk Glaciology' (1897), which contained nearly 500 references, with abstracts.

Of great archæological interest is 'The Bibliography of Stonehenge and Avebury,' published in 1901. This contains particulars of 947 papers and books, some dating as far back as B.C. 330!

Another of his labours, which has perhaps been as helpful as any, is his 'Geology of the Counties of England and Wales.' At first this was a series of articles dealing with the geology of the respective counties, appearing in Kelly's County Directories. In each volume Mr. Harrison gave a concise account of the geology of the county, and also references to the principal papers and books referring thereto. These were reprinted in one volume by the publishers, and though the work has long since been out of print, it was never re-issued apart from the Directories, for possibly obvious reasons. During the last five years of his life a considerable time was occupied in revising these county memoirs for new editions of the Directories. Fortunately this work was just completed; and only on the evening before he died he was occupied in making a few slight corrections to a complete proof copy for his son.*

He also wrote and edited numerous well-known text-books dealing with Geology, Physiography, Metallurgy, Photography, Domestic Economy, Agriculture, Mechanics, Chemistry, and Magnetism and Electricity. His smaller papers also refer to a variety of subjects, though they principally relate to the geology and palæontology of the Midlands. His first paper, written in 1873, was 'On the Discovery of Leaden Coffins in Leicester,' and his last, published in 1907, referred to 'Coal beneath the Old Library, Birmingham.'

He was an ardent supporter of the Land-Ice Theory, taking a keen interest in the subject in the early days of the Glacialists' Association, when conflicts between 'glacialists' and 'submergers' were frequent. For some years he was editor of the 'Midland Naturalist.'

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* Ten proof copies of the complete work, brought up to date, were left by the author at the time of his death, together with a memorandum as to how they were to be disposed of, viz.:—The Geological Society, London; the Geological Survey Office; the Natural History Museum, South Kensington; the Geologists' Association; the Birmingham University Library; the Old Library, Birmingham; the Reference Library, Birmingham; W. Jerome Harrison, J. A. Harrison, and T. Sheppard. These copies are being finally corrected by Mr. J. A. Harrison.

Mr. W. Jerome Harrison, as might be imagined, was a most successful science teacher. Before he was appointed Chief Curator of the Leicester Museum he was the Headmaster of various public elementary schools. He left the Museum on being appointed Chief Science Master under the Birmingham School Board, and in 1902 was appointed Chief Science Demonstrator at Birmingham.

In the local scientific circles Mr. Harrison took an active part. 'He was an enthusiastic amateur photographer, utilising his hobby in a most effective manner for the purpose of illustrating his scientific demonstrations. It was he who really initiated the Midland Photographic Survey, and the majority of the early photographs in the possession of the Birmingham Natural History Society, chiefly dealing with geological formations, are his work.'

Notwithstanding the enormous scientific work he accomplished, he was able to take a practical interest in literary matters, being responsible for Blackie's 'Shakespeare-Land—an Illustrated Description of Shakespeare's Country.' For some years past, also, he has been collecting material for a volume on 'The Life and Work of George Eliot,' which it is hoped may yet be published.

Quite apart, however, from his far-reaching scientific work, he will long be remembered by those who knew him personally, for his kindness and desire at all times to assist students in their work. Long before I ever met him, I was greatly indebted to him for many acts of courtesy. And the more one knew him the more one appreciated his sterling worth.

Mr. Jerome Harrison was a Yorkshireman, having been born at Hemsworth, near Doncaster, sixty-three years ago. He leaves ten sons and daughters, who share their father's tastes ; and, with one exception, they are all engaged in the teaching of science and art. To them, and to their mother, we extend our sincere sympathy. T. S.

List of Scientific Papers by W. Jerome Harrison, F.G.S.

'On the Discovery of Leaden Coffins in Leicester.' *Leicester Daily Post*, Nov. 1st, 1873.

'On the Discovery of the Rhætics near Leicester.' British Association Report, 1875.

'On the occurrence of the Rhætic Beds in Leicestershire.' Quart. Journ. Geol. Soc., Vol. xxxii, 1876.

'Notes on the Geology of the North Midlands.' 1876.

'On the Rhætic Section at Dunhampstead, near Droitwich.' Proc. Dudley Geol. Soc., Vol. iii., 1877.

'On the Geology of Leicestershire.' Proc. Geol. Assoc., Vol. v., 1877.

'On the Leicestershire Coalfield.' Proc. Dudley Geol. Soc., 1877.

'On the Geology of Charnwood Forest.' Proc. Dudley Geol. Soc., 1877.

'On an Improved Aneroid Barometer.' Mid. Nat., Vol. i., 1878.

'On a Scheme for the Examination of the Glacial Deposits of the Midland Counties of England' Mid. Nat., Vol. i., 1878.

'On Digging out a Boulder.' Mid. Nat., Vol. i., 1878.

'On Garnets in Charnwood Rocks.' Mid. Nat., Vol. ii., 1879.

'On Fossiliferous Bunter Pebbles in the Drift.' Mid. Nat., Vol. ii., 1879.

'On Rocks of Brazil Wood, Charnwood Forest.' Mid. Nat., Vol. ii., 1879.

'On the Rhætic Star-fish Bed.' Science Gossip, 1880.

'On Deep Borings in the S.E. of England.' Mid. Nat., Vol. iii., 1880.

'On the Itinerant Method of Teaching Domestic Economy in Public Elementary Schools.' Report. Dom. Econ. Congress, Society of Arts, 1881.

'On the Palæontological Society.' Journal of Science, 1882.

'On the Quartzite Pebbles contained in the Drift, and in the Triassic Strata of England ; and on their Derivation from an Ancient Land Barrier in Central England.' Proc. Birm. Phil. Soc., Vol. iii., 1883, p. 157. *See also* 'On the Microscopic Structure of Specimens of Quartzite collected by W. J. Harrison, by J. J. H. Teall.' Trans. Birm. Phil. Soc., Vol. iii., 1883, p. 194.

'Syenites of S. Leicestershire.' Mid. Nat., 1884.

'On the Pre-Carboniferous Floor of the Midlands.' Mid. Nat., Vol. viii., 1885, pp. 38, 69, 100, 131, 163, 194.

'On the Work of a Local Photographic Society.' Photographic News, Vol. xxix., 1885.

'On the Rise and Progress of Photography.' Cornhill Magazine, May 1885.

'On the Discovery of Rocks of Cambrian Age at Dosthill in Warwickshire.' Mid. Nat., Vol. ix., 1886.

'Some Notes upon a Proposed Photographic Survey of Warwickshire.' Jan. 1890.

'Proposal for a National Photographic Record and Society.' The (Royal) Photographic Society of Great Britain, 1892.

'On the Desirability of an International Bureau Established (1) to Record, (2) to Exchange Photographic Negatives and Prints.' Report World's Congress at Chicago, 1893.

'On the Search for Coal in the S.E. of England.' 1884.

'A Bibliography of Midland Glaciology.' Proc. Birm. N. H. & Phil. Soc., Vol. ix., 1895, p. 116.

'On the Glacial Geology of the Yorkshire Coast.' Glacialists' Magazine, Sept., 1895.

'A Bibliography of Norfolk Glaciology.' Glacialists' Mag., March, June, Sept., 1897.

'Sketch of the Geology of the Birmingham District.' Lapworth, Watts and Harrison. [Reprint published by Cornish Bros., Birmingham, Price 2/-] 1897, and revised and reprinted in 1907.

'On the Ancient Glaciers of the Midland Counties of England.' Proc. Geol. Assoc., Vol. xv., 1898, p. 400.

'On the Desirability of Promoting County Photographic Surveys.' Brit. Assoc. Report for 1906.

'On Coal beneath the Old Library.' Birmingham Lib. Mag., No. 8, p. 85. 1907.

List of Books of which W. Jerome Harrison was either the Author or Editor.

1. 'Manual of Practical Geology.'
2. 'Earth Knowledge ; a Text-Book of Elementary Physiography.' Part I. Eleventh edition. Blackie's Science Text-Books.

3. ‘Earth-Knowledge ; a Text-Book of Advanced Physiography.’ Part II. 240 pp. New edition, 1896. Blackie's Science Text-Books.
4. ‘Mechanics.’ Parts I., II. and III. Nelson & Sons.
5. ‘Domestic Economy.’ Parts I., II. and III. Nelson & Sons.
6. ‘Agriculture.’ Nelson & Sons.
7. ‘A Text-Book of Geology.’ Fifth edition, 1903. Crown 8vo. 350 pp. Blackie.
8. Blackie's Guides to the Science Examinations.
9. ‘The Geology of Leicestershire and Rutland.’ Published by Spencer, Leicester.
10. ‘The Geology of the Counties of England and Wales.’ Originally published in 1881 by Kelly's Directories Ltd. (Reprinted from the Directories). During the last five years new editions of the County Directories have appeared, in which the Geological chapters have been revised and brought up to date.
11. ‘Photography for All.’ Published by Sturmey & Co., Coventry. New edition.
12. ‘The History of Photography.’ Published by Percy Lund & Co.
13. ‘The Chemistry of Photography.’ Published by Scovill & Co., New York.
14. ‘Anthony's International Annuals.’ Vols. I.- Published by Messrs. E. & H. T. Anthony, Broadway, New York.
15. ‘Chemistry for All.’ Blackie's Science Text-Books.
16. ‘Magnetism and Electricity.’ do.
17. ‘Chemistry for Beginners.’ do.
18. ‘The Elements of Metallurgy.’ do.
19. ‘Junior Chemistry and Physics.’ do.
20. ‘Practical Experiments in Elementary Science.’ do.
21. ‘The Bibliography of Stonehenge and Avebury.’ Wiltshire Archæological Society.
22. ‘Shakespeare-Land ; an Illustrated Description of Shakespeare's Country.’ Irving Shakespeare Series. Blackie.

◆

We have received the **Report of the Oldham Microscopical Society and Field Club** for 1905-6-7. It contains a useful record of the work accomplished by the Society, with summaries of papers read at the meetings, etc. There are obituary notices of Thomas Parker and Thomas Pratt ; lists of animals and plants observed in the rambles, etc. The most generally interesting item, however, is ‘A list of the Mammals of the Oldham disdrict,’ by Mr. Fred Stubbs. No fewer than thirty-nine species occur in the list, nineteen of which Mr. Stubbs has seen in the district in a wild state.

Russian and Bulgarian Folk-Lore Stories, by **W. W. Strickland, B.A.** London : Geo. Standring. 132 pp.

Mr. W. W. Strickland is well known for his researches in Slavonic folk-lore. In the present volume he gives a first-hand translation from Karel Erben's ‘One Hundred Popular Slavonic Folk-Lore Stories.’ We share with Mr. Strickland his opinion of the great scientific value of folk-lore stories, and, as shewn in his present work, some of the tales which have been handed down generation after generation are to be matched in many different tongues. The author's notes upon the stories are also a valuable feature, and at once indicate the breadth and extent of his reading. In a story on ‘The Migration of Souls,’ reference is made to a being who was first a fish, then a bird, then an ant, and finally a quadruped. His opinion was that ‘there is nothing jollier than life amongst the ants ; and, among human beings, nothing sorrier.’ The language used by Mr. Strickland is one that can be readily understood by quite young readers, who will appreciate the many excellent stories ; but the volume has a much greater fascination for any educated ‘grown-up.’

FIELD NOTES.

BIRDS.

Lesser Redpole's Nest in a Hawfinch Nest.—When searching for Hawfinch nests this season in Skipton Woods, I was surprised to find that a pair of Lesser Redpoles had built their nest on a last season's Hawfinch Nest in a Poplar tree, about 18 feet from the ground, and had a full clutch of eggs. I think this is a very unusual occurrence for the Redpole.—WALTER WILSON, Skipton-in-Craven, 13th July, 1908.

Green Sandpiper at Bolton Abbey.—At noon of August 14th I had the pleasure of seeing a Green Sandpiper on the margin of the fish ponds here. It was busy feeding, and stayed for two hours after I first saw it. With a pair of binoculars, I managed to conceal myself within fifteen yards unnoticed, and had it under observation some time. It was an adult in fine plumage. It eventually left in a northerly direction, rising to a considerable height.—THOS. ROOSE, Bolton Abbey.

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MAMMALS.

White Hedgehog at Skellingthorpe, Lincs.—A fine albino hedgehog was killed on the 12th July in the above parish. It is a very large female, and, with the exception of a few bands of a darker shade across the spines, is absolutely greyish white, irides pink.—J. F. MUSHAM, South Park, Lincoln.

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LEPIDOPTERA.

Micro-Lepidoptera in East Yorks.—On the excursion of the Hull Scientific and Field Naturalists' Club, to Kelsey Pits near Ryehill on the 11th August, 1906, Mr. J. Porter, of Hull, and I took larvæ of *Chilo phragmitellus* freely at the roots of the Common Reed. We did not at the time know the larvæ, but I have bred imagines during the summer of 1907 from the larvæ taken there. At the same place Mr. J. Porter took, in the spring of 1907, larvæ of *Laverna phragmitella* in the old flower heads of the bulrush. At the Yorkshire Naturalists' Union Meeting at South Cave on the 22nd June, 1907, the latter took *Nepticula salicis*, and I found cases of *Coleophora laricella* common on young larch trees in the Park, taking at the same time *Lithocolletis cramerella*.—G. W. MASON, Barton-on-Humber.

REVIEWS AND BOOK NOTICES.

The Ancient Port of Whitby and its Shipping, by **Richard Weatherill.** Whitby: Horne & Sons. 456 pp.

The old captains and others who remember the whaling days, in common with many people who have been to school much more recently, call whales 'fish.' And in the taverns at Whitby many a pleasant evening is spent in reciting various 'fish' stories of half a century or so ago. If the 'tallness' of these stories, compared with the fish stories one hears from present-day anglers, is anything like the proportion of the sizes of the respective 'fish,' an evening at Whitby, with glasses, and genial company, must be an experience to be remembered. The author of the present book tells us of these meetings, and 'at such times, the name, date, and owners, etc. of some vessel would often be a matter of debate and difference of opinion.' *The wish for accuracy* in these details resulted in the records now made. The object of the volume is, therefore, commendable! But, apart from this, the records of the 'good old times' of whaling are each day becoming less possible of confirmation, and every effort should be made to gather together such information as is available.

Whale's Jaw Bones used as Gate Posts.

In his book Mr. Weatherill has doubtless rescued and preserved much valuable material that would otherwise have perished—material which will be much more appreciated in years to come than it is to-day. The history of the Whitby shipping is so inseparably connected with the shipping of Hull and other ports, that the present work should have, and doubtless will have, a much wider circulation than that of an ordinary local book. By far the greater part of the volume is devoted to a catalogue of the sailing vessels of Whitby. Other chapters deal with Whitby piers, lighthouses, etc., whale-fishing, Captain Cook and his vessels, the Scoresbys, Geo. Chambers, Whitby traders, tugs, life-boats, etc. The book is well illustrated by reproductions from photographs of drawings of the old whalers, old Whitby, its piers, etc. (one of these illustrations is given herewith by the courtsey of the publishers). For the better printing of these, glazed paper is used, resulting in a rather weighty volume for its size, and one which cannot well be read in bed !

The Enchanting North, by **J. S. Fletcher.** London : Eveleigh Nash. 253 pp., price 2/6.

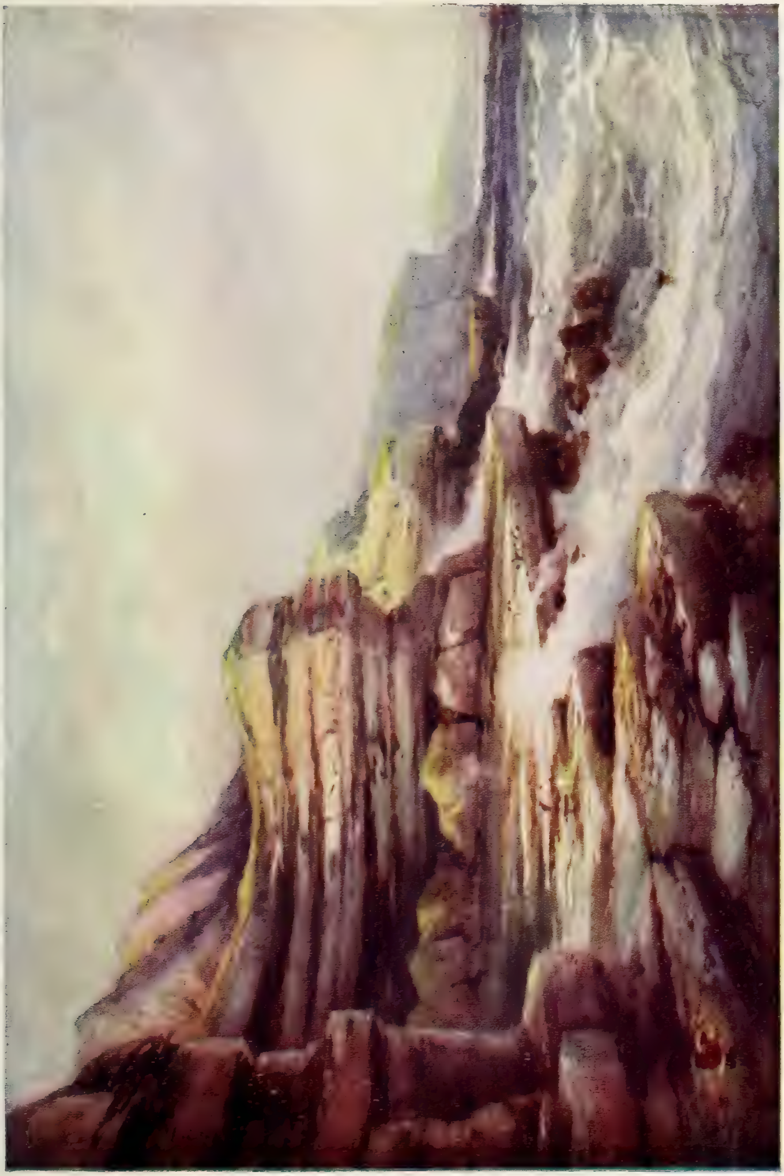
A Book about Yorkshire, by **J. S. Fletcher.** London : Methuen & Co. 370 pp., price 7/6 net.

Almost simultaneously Mr. Fletcher has produced two handsome volumes which will doubtless do much to popularise 'the playground of England'—Yorkshire, and the counties to the north. Both volumes are admirably produced, both are well illustrated by charming coloured plates, as well as by photographs. One (the Yorkshire Volume) has a map on which no railways are shewn ; the other contains a large folding map which clearly indicates how well a certain railway company can convey the holiday-maker to a variety of scenes—mountain, moor, and cliff, which should surely satisfy the demands of even the most particular.

With regard to 'The Enchanting North,' this is cheap as a picture-book alone. There are no fewer than eighteen coloured plates from oil paintings and water colours, by well-known artists ; twelve pen-and-ink sketches, and seventy photographs. Two of the first—views which will be familiar to most of our readers—we are permitted to reproduce (plate xxx. and xxxi.). The volume is in four parts : (1) Yorkshire ; (2) Teesdale, Weardale and the Durham Coast ; (3) Westmorland and Cumberland ; and (4) Northumberland. In each of these sections Mr. Fletcher has chosen for description the most interesting and most beautiful places, and has also included just those pieces of information with which a tourist likes to be acquainted when visiting an enchanting region. For example on referring to the Yorkshire watering-places, the author writes : 'there is a nice and almost a humorous gradation about the sea-side resorts. Of the principal four, Bridlington is popular and Bank Holidayish ; Whitby is grave, literary, artistic and aristocratic ; Filey is just the place for honeymooning couples, old maids and families ; Scarborough is Filey, Whitby, and Bridlington all rolled into one.' We are now wondering whether to go to Filey or to Whitby for our next holiday. The greatest attraction of 'The Enchanting North,' however, is its cheapness. It must be in anticipation of an enormous sale, which it certainly warrants.

In 'The Book about Yorkshire' the writer adopts a scientific method, which is quite an agreeable change from the usual guide-book plan, where an author usually plays the honey-bee and flits from flower to flower, drawing what he can from each. 'A Book about Yorkshire' is a delightful series of essays, each complete in itself, and each dealing with the county as a whole, from some particular aspect :—the Yorkshire Castles ; the Making of the Minsters ; Picturesque Yorkshire ; Literary Associations of Yorkshire ; Eccentricities and Celebrities, etc., etc.

The book opens with an account of the Palæolithic hunters, and we are entertained with a comparison between palæolithic and neolithic life in the county. We have still to learn, however, of undoubtedly palæolithic remains in Yorkshire, notwithstanding the fact that elsewhere in the volume



Cliffs at Filey.

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View from Ravenscar.

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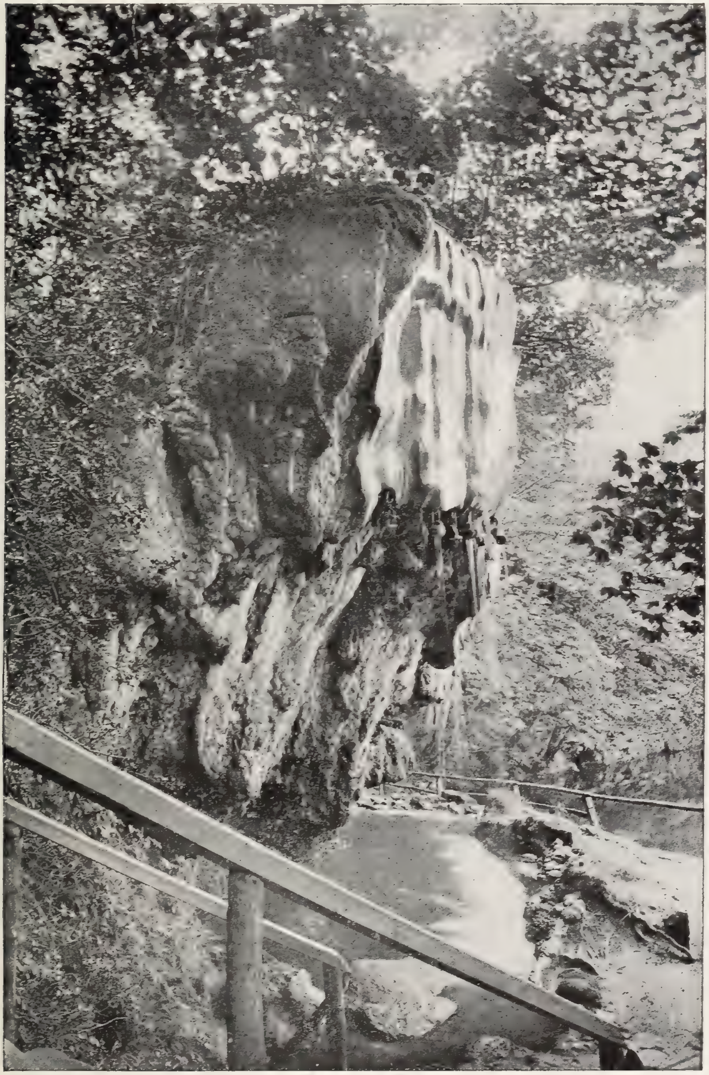

The Dropping Well, Knaresborough.

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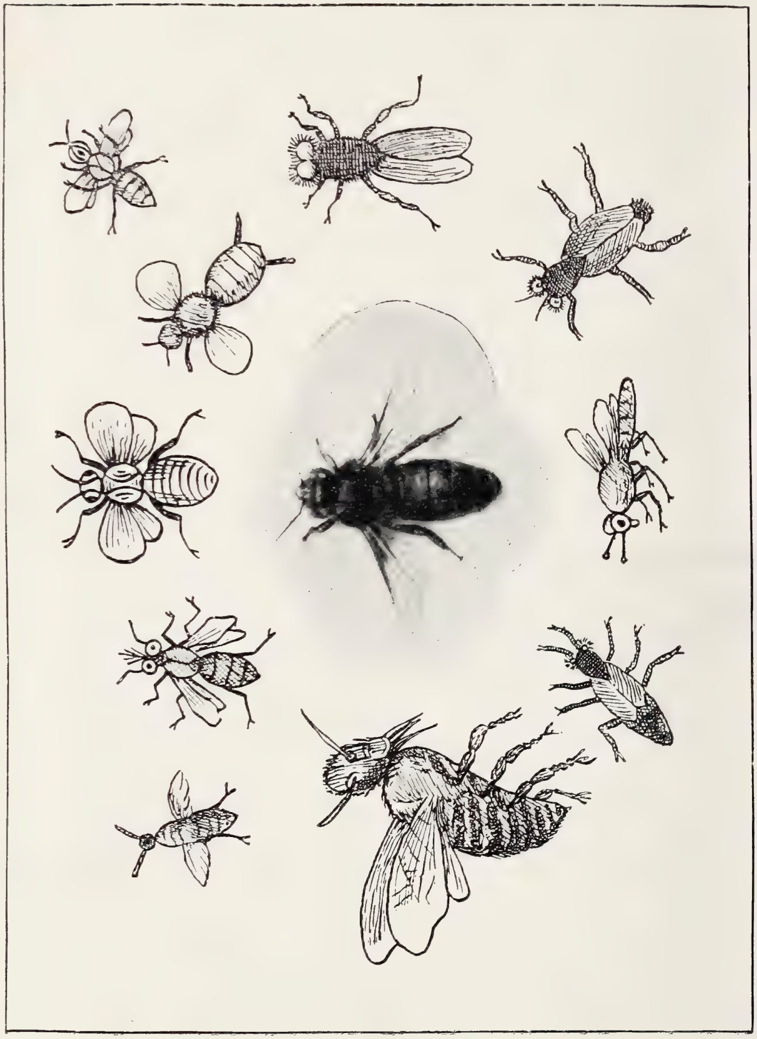

The Honey-bee (enlarged) from life, and as some of the ancient draughtsmen depicted her.

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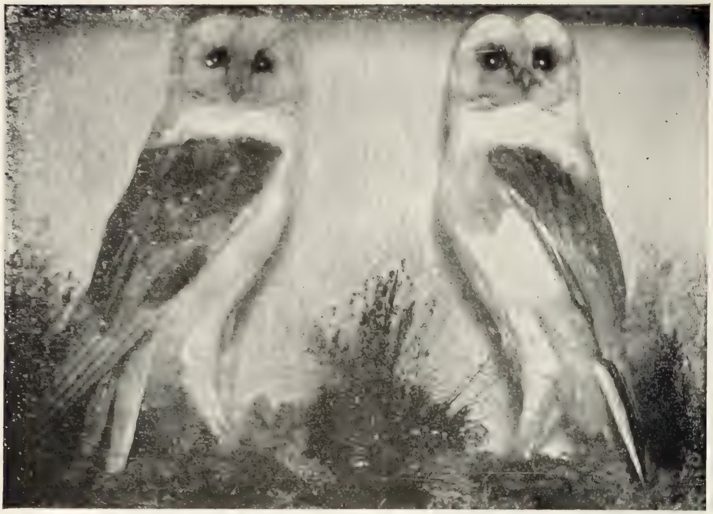
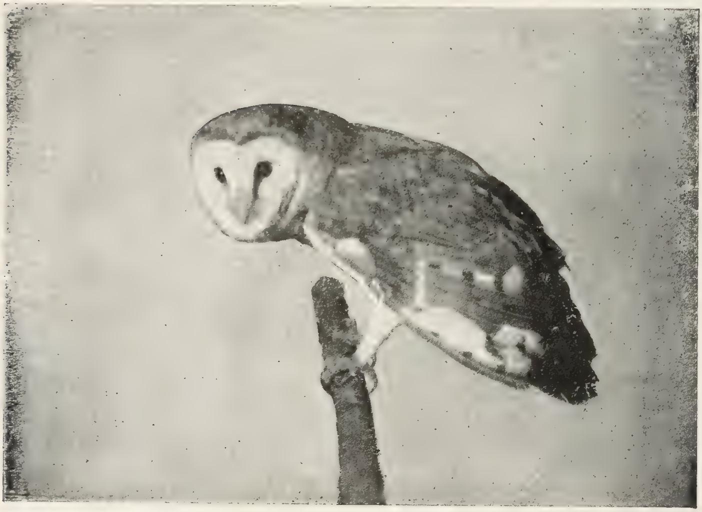


Stuffed Barn Owls.



Live Barn Owl.

we are informed that 'palæolithic remains in abundance' have been found in more than one locality. In a subsequent chapter, also, dealing with the antiquities of the shire, it is a little surprising to find that Windle's 'Remains of the Pre-historic Age of England' has evidently been the author's text-book. Had he seen Volume I. of the 'Victoria History of Yorkshire,' his list of localities for Bronze-Age implements would not have been so meagre, and Mortimer's 'Forty Years' Researches' (which is not even referred to), would certainly have given much more up-to-date information regarding the barrows.

In the chapter on 'Modern Yorkshire,' we learn that 'Hull, indeed, *as being the only great seaport*' is one of the sights of Yorkshire; but *it is only fair to the rest of the county* to say that the great Humber port possesses a slight foreign atmosphere which has been gained by much intercourse with countries over-sea.' Possibly this will take some of the conceit out of the people of Hull! In justice to them, however, we should say that a photograph of Holy Trinity Church and the Market Place, taken to-day, would present a very different and less 'foreign' aspect from that shewn on the plate in the book. For the illustrations we have nothing but praise, though the coloured plates have a great preponderance of greenish yellow, which makes them look rather bilious. We are kindly allowed to reproduce one of the plates (plate xxxvii..)

The Lore of the Honey Bee, by **Tickner Edwardes.** London: Methuen & Co. 281 pp., price 6/- net.

The author of this book seems to know all about bees and bee-keeping, from the ancient fable about the origin of the honey-bee, to finding wives for single bee-keepers (*i.e.* single young men who keep bees; not those who 'keep a bee'!). He deals very fully with the ancient lore relating to bees, and has been successful in obtaining much quaint information relating to the old 'bee-masters' and their beliefs. He also refers to the wonder of the bee-world—the queen, the 'bride-widow,' comb-builders, bee-swarms, etc., etc., and also has chapters on 'The Modern Bee Farm,' and 'Bee-keeping and the Simple Life.' The book is pleasantly written, and will interest many besides bee-keepers. To our readers we specially recommend it. One of the illustrations is reproduced herewith (plate xxxviii.) by the permission of the publishers.

Mr. P. W. Westell may well say, though modestly, that he is a 'writer of books on natural history subjects, designated to interest, elevate, and amuse young and growing children'; as during the past few months his books have appeared with a frequency which can only be understood when one looks at the style in which they are written. **Every Boy's Nature Book** (Religious Tract Society, 374 pp., 3/6) is of the usual type, and contains much, very much, that we have seen before. But the title is new, and the one hundred and sixty-two photographs, by the Rev. S. N. Sedgwick, which are alone worth the money, are also new. There is also an Introduction by the Hon. Sir John Cockburn, late Premier of South Australia; and two plates from the 'Boys' Own Paper' in a pocket at the end. So that in one way and another we have a cheap and attractive book. The pity is that Mr. Westell has not given us a little more originality in his section. As one admirable example of the care taken by the Rev. S. N. Sedgwick in selecting his photographs, we are permitted to reproduce two of them, which explain themselves (plate xxxix.).

In **The Young Botanist,** by **W. P. Westell** and **C. S. Cooper** (Methuen & Co., 199 pp., 3/6 net) we find for the first time a second author to share the honours. As might be expected, the back-bone of the book consists of eight coloured and sixty-three black and white plates of plants, drawn by C. F. Newall. These are all that can be desired, and having regard to the cost of the book, the coloured plates are very fine indeed, and well reproduced. Around these is wrapped a list of plants 'of a herbaceous character,' culled from any of many well-known botanical works. On an average, half a page is devoted to each species, under nine heads:—where found, flowering period, colour and form of flower, inflorescence, character of foliage, height of plant, fruit, salient features,, and [the] order to which [the] plant belongs.

The readable part of the book consists of sixteen pages 'Hints for the young Naturalist,' and tells how to collect, preserve, and photograph the plants. As this book is evidently going to run through several editions, it is not necessary to recommend it. We notice it is 'First published in 1908,' and we also observe that in the event of the work proving acceptable, it will be supplemented by a second one, dealing with trees and shrubs. How many more books we are to have dealing with our 'plants' and 'trees' we cannot say; they seem to be competing in numbers with books on birds.

Selborne Nature Reader. Introductory Book, Fairyland Lane (a Nature Story), by **Margaret Cameron.** Sir Isaac Pitman & Sons. 130 pp., price 10d.

In this little book the late head-mistress of the Harehills Infants' Council School, Leeds, gives some entertaining nature stories for the use of young children. The book deals with the weather, slugs, insects, flowers, etc., and is well illustrated by coloured plates and blocks from photographs. The book can be specially recommended as an introductory reader, and it contains only four words with four syllables,and only twenty-four with three syllables. In a future edition it would be an advantage if the red colours in the plates were toned down a bit.

Leonardo da Vinci, by **Richard Muther.**

Murillo, by **A. F. Calvert.** London: Siegle Hill & Co. 71 pp. and 64 pp. respectively. Cloth 1/6, Leather 2/6.

These charming volumes are two additions to these publishers' well-known Langham Series of Art Monographs, and in addition to the letter-press, written by most capable authors, are illustrated by reproductions of the paintings described. Some of these, mounted on tinted papers, are very effective. The books are attractively 'got up,' and are wonderfully cheap.

Neolithic Dew-ponds and Cattle-ways, by **A. J. Hubbard** and **G. Hubbard.** Second Edition. Longmans Green & Co. 166 pp., 4/6 net.

Some years ago a well-known 'antiquarian,' living in South Yorkshire, wrote a series of papers in which he endeavoured to show that almost every important event in English history had taken place upon or adjacent to his property. A possible exception was the landing of Julius Cæsar. As time went on he took a house at Cromer, and in due course, as his friends almost anticipated, a paper appeared proving (!) that Cæsar landed at Cromer, the white cliffs of Albion being clearly at that place. We do not go so far as even to suggest that in the present instance the authors are similarly—enthusiastic, but they certainly seem to see neolithic dwellings dotted over the downs, cattle-ways along the running brooks, and dew-ponds in everything! There can be no doubt that in the district around Dorchester there are several evidences of early man—some excellent examples of which are figured in the book. But whether all the depressions are dew-ponds; the track-ways cattle-tracts; and the small hollows, pit dwellings, are matters for differences of opinion. In any case, we cannot admit that a case has been made out in favour of even a fair proportion of them being really neolithic in age. With some of the illustrations, it is evident that someone with a much better imagination than the present writer is required in order to see in them what the author would have us see Whilst not convincing, the authors state their case well, and the subject is worthy of the thought and consideration of antiquaries. And even the quotation from Kipling about the never-failing unfed dew-ponds of Sussex does not refer to their neolithic age; though, perhaps, that would hardly be poetical

Across the Broad Acres: Being sketches of Yorkshire life and character, by **A. N. Cooper.** Hull: A. Brown & Sons. 316 pp., 3/6 net.

In this volume the Walking Parson has gathered together a number of stories relating to Yorkshire, which will go well to pass away a pleasant afternoon. One or two are of particular interest—for example, that relating to Sir Charles Strickland, the original of 'The Madman' in 'Tom Brown's Schooldays'; and the race horse 'The Darley Arabian,' which is thought to have had much to do with the 'Making of Yorkshire.'

Amongst the tales are many 'chestnuts,' though, perhaps, none the worse for reproduction; and some of the stories fall very flat towards the close, and most have a distinctly 'Sunday-School' flavour, which, perhaps, is inevitable. We learn that the birds who [sic] breed at Bempton and other parts of the Yorkshire coast migrate to Holland, then to Spain, and thence to the Soudan, thus forming 'The Letter Z,' the text of another good (*i.e.* Christian) story; that Middlesborough owes its existence to a rabbit; and a canary caused the erection of some large works near Castle Howard. There is thus some natural history in the volume! We don't like to see a writer's portrait as a frontispiece to a volume, as it may give a stranger the impression that the author is conceited—an impression which would certainly be wrong in the present instance. But we cannot understand why the Walking Parson and his daughter were photographed whilst dancing a cake-walk at his front door, and it was really unkind of the publishers (who have otherwise done their work very well) to have reproduced the photograph unknown to the author. As Mr. Cooper wisely says, however, 'soft words don't butter parsons,'—we mean 'parsnips.'

NORTHERN NEWS.

Mr. C. B. Ticehurst gives the result of the wood-pigeon diphtheria enquiry in the August 'British Birds.' From this it is apparent that the disease was practically confined to the counties bordering the Thames Valley.

The Herbarium of the late W. R. Linton has been presented by his widow to the Liverpool University. It contains an excellent collection of British plants, and is particularly strong in Brambles, Willows, and Hawkweeds.

We notice it has been suggested that to prevent cats from indulging in the 'cruel habit' of catching young birds, a dead bird should be securely tied round the cat's neck, and left there for a few days! This, of course, would not be cruel!

If the editor of 'The Animal World' is not careful, he will soon be a competitor with another journal which is devoted to truth and nature. The 'Dog Stories' in the August 'Animal World' are really worthy of a certain angling column.

A writer in the August 'Zoologist' informs us that 'during the first week of June three sand-grouse were observed in a field of young corn in the eastern portion of Cleveland. *Shortly afterwards one of them was picked up dead'!* The other two 'disappeared' a little later.

Another new British bird, from Kent, is recorded in 'British Birds.' It is the South European Large-billed Reed Bunting. Kent is very near the continent, and if every straggler that gets blown over is to be a 'new *British* bird,' the B. O. U. list will soon require extending.

'Natural history' is getting quite interesting. Under the heading of 'Clever Swan and Trout,' we learn that a swan has been trained to pull a rope and ring a bell for bread. 'Stranger still,' a trout in the same lake has also been seen to 'take hold' of the string, and make the bell ring. A photograph of a lady who saw it is sent as proof; which reminds us of a certain 'horny theologist' in Yorkshire, who took some fellow-naturalists to see a window from which he had seen a rare bird—a 'gull' we believe it was.

It is a relief to learn that the various natural history 'freaks' recently recorded in the daily press as occurring at Selby, were 'invented' in order to supply the pressing demands of a local reporter.

Under the heading 'Animals that cannot Swim,' we are informed that 'Neither the ape nor the camel are able, it is said, naturally, to swim.' Ah! but what about the grass-hopper and the butterfly!

A Middlesborough 'naturalist' informs his readers that a pair of tom tits has hatched two hundred eggs in a letter-box at the Uttoxeter workhouse. No wonder they wanted out-relief. He has also caught a North American Silk Moth, measuring six inches across the wings, in the park there.

An account of 'Flint Jack,' together with his photograph, and also of many examples of his handiwork, appears in the August 'Antiquary.' It is written by the Hon. Secretary of the Yorkshire Naturalists' Union. Strangely enough some of these identical forgeries were some years ago figured in a Yorkshire publication as the work of pre-historic man.

The fly-fishers of Great Britain have so impressed the Committee dealing with the Sale of Plumes Bill, that 'having regard to the small quantity of feathers used for the manufacture of artificial fishing flies, they have inserted in the Bill amendments for their protection.' The protection of the fishing flies we presume! Anyway, it will give Donald an excuse the next time he is caught shooting a Golden Eagle :—It will be 'to bait fish withal.'

"CORRECTION.—With reference to the paragraph 'Killed by a weasel' 'on page 199 of — — your correspondent is in error, as the weasel is not found in Ireland. The animal was a stoat." It is a pity this mistake was made in a paper which is so careful about being accurate, especially as we heard the other day that one animal could be so weaselly distinguished from the other as it is stoatally different. This was at a dinner. 'God save the King' immediately followed.

'I am migrating southwards with the swifts and the cuckoos; though *as yet*, beyond the desire that it shall be outside the radius of brick and mortar, *yet* not far from London, I do not know *yet* the spot which may hereafter lend some of its colour to my passing notes of nature.' The above example of Gilbert-White-Jefferies style appears above initials which are not Y. E. T., *yet* perhaps it is not necessary *yet* to say what the initials are. As the writer in question has migrated with the cuckoos, we wonder if his paper will yet retain its old name, or be incorporated with one of the Sloper Chips brand.

'Punch' is really too bad. Notwithstanding our appeal urging it to cease competing with one of its weekly contemporaries, it has now copied the very style of its natural history competitor. Since our last issue we find the following in 'Punch':—'NATURAL HISTORY NOTES.—Rabbits are so superstitious that nothing will induce them to sit down thirteen to table.

'As a general rule bees will not be put off with imitation buttercups when the real thing is readily available.

'It has now been proved beyond a shadow of doubt that the ordinary boa has no feathers.

'A big-game hunter of European reputation says emphatically that he would rather be kicked by an elephant than by an ostrich—that is if he had to be kicked at all.

'The common cat in good health has 2,247,316 hairs on its body. The figures are taken from the last census.

'Pumas, for some reason best known to themselves, will never knowingly attack non-smokers.'

Dare we venture to suggest to 'Punch' that there is not room for two periodicals devoted to information of this kind? Sooner or later, one must go to the wall, and we should so much miss 'Punch.'

BRITISH MUSEUM NATURAL HISTORY
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A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

T. SHEPPARD, F.G.S., F.S.A.Scot.,
The Museum, Hull;
and
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Technical College, Huddersfield.

MUSEUM
NATURAL HISTORY

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THE NATURALIST. A Monthly Illustrated Journal of Natural History for the North of England. Edited by T. SHEPPARD, F.G.S., Museum, Hull; and T. W. WOODHEAD, F.L.S., Technical College, Huddersfield; with the assistance as referees in Special Departments of J. GILBERT BAKER, F.R.S., F.L.S., PROF. PERCY F. KENDALL, M.Sc., F.G.S., T. H. NELSON, M.B.O.U., GEO. T. PORRITT, F.L.S., F.E.S., JOHN W. TAYLOR, and WILLIAM WEST, F.L.S. (Annual Subscription, payable in advance, **6/6** post free).

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All communications should be addressed to the Hon. Secretary,

T. SHEPPARD, F.G.S., The Museum, Hull.

NOTES AND COMMENTS.

PEREGRINE PROTECTION.

The Westmorland police have recently taken action, through information supplied by the Y.N.U. Wild Birds' Protection Committee, against Fred Bellas, a platelayer, living at Mallerstang, for taking some young Peregrine Falcons from the nest. He was ordered to pay costs and release the young Falcons in the presence of the police. The Chairman of the Magistrates remarked it was well for him that the case was tried in Westmorland where only the eggs are protected, as had it been brought in Yorkshire, the penalty would have been more severe.

A WHITE SWALLOW.

From the 'Yorkshire Evening Post' also we learn that 'Reginald Renton, of the Fountain Hotel, Otley, was summoned at Otley, on a charge of shooting a white swallow. Defendant said he had thought the bird a novelty, and had even told the Press about it, thinking there was nothing wrong. The Chairman (Mr. E. P. Arnold-Forster) asked the defendant if he did not think it a thoughtless and needless thing to try to kill so interesting a specimen as a white swallow. It was one of the most interesting creatures possible. He ought to have been ashamed of himself. Defendant was ordered to pay the costs.' In this case the fine was not a serious one, but the fact that the Y.N.U. have been successful in getting this case brought before the notice of the public, is very satisfactory. We need not draw attention to the great value of a white swallow to ornithologists in watching the migration of these birds.

BUZZARD SHOT AT SKIPTON.

In addition to the preceding, the Y.N.U. Committee has been successful in securing a conviction against a man for shooting a Buzzard at Skipton. He was fined 1/- and 15/6 costs. If any of our readers are in a position to assist the Wild Birds' and Eggs' Protection Committee in its work, by giving information, will they kindly communicate with the secretary of the Committee, Mr. Riley Fortune, F.Z.S., 5 Haywra Street, Harrogate, or with the editors of this journal. There will not be any necessity for the names of the informants being brought forward if they do not wish it.

BIRD PROTECTION IN CUMBERLAND.

We have been asked to give publicity to the following communication from Mr. Linnæus E. Hope, the Curator of the Carlisle Museum :—‘ As some misleading statements respecting the protection of birds in Cumberland have been recently published by scientific journals, I should like, through “ The Naturalist,” to correct some of these mis-statements. In the September number of “ Knowledge ” Mr. W. P. Pycraft states that the Cumberland County Council have made the “ unfortunate blunder ” of removing protection from the Common Buzzard and the Black-headed Gull.

These statements are untrue, and may prove mischievous by leading collectors to believe that eggs or examples of the Common Buzzard may be taken with impunity in Cumberland.

The Buzzard is fully protected, eggs and birds, in this county, and the Black-headed Gull still enjoys the protection afforded it by the Act of 1880.

I do not know why anyone should make this unwarranted attack upon the Cumberland County Council and its advisers (one of whom I have the honour to be), but it would have been more satisfactory if he had taken the trouble to ascertain the truth of any communication he may have had or seen on this matter before perpetuating such mis-statements.’

POLICE PROTECTION AT SHEFFIELD.

Even the policemen at Sheffield can make the most of things ! The following is an extract from a heart-rending report in the ‘ Sheffield Telegraph ’ for September 21st, under the heading ‘ Attacked by an Eagle ; Police Constable's startling experience ’ :—‘ When near to Wadsley Asylum, his ear was pierced, and his heart scared by a shrill penetrating wail, as of some bewildered soul wandering through the vale of its bodily experience, and there was seen a mighty form with wings outstretched, looming through the air like unto a rapacious eagle seeking a stray lamb. And in this instance the lamb from the fold appeared, at least to the eye of the bird, to be the constable, for it made pugnaciously for that guardian of the peace. Without hesitation he grappled with the foe, using such force that its neck stretched beyond its natural limits, dislocated its cervical vertebræ, leaving a dead mass of still glowing feathers in his hands.’ Needless to say, this terrible beast with the ‘ glowing feathers,’ was an escaped baby sea-gull, with its wing clipped. We hear that the specimen has been sent to the Sheffield Museum!

THE SIZE OF THE MAMMOTH.

In a note in 'Nature' on the size of the Mammoth, Mr. F. A. Lucas gives the result of several years' observations and measurements. The ordinary mammoth (*Elephas primigenius*) attains a height of 9 ft. or 9 ft. 6 in.; the Colombian mammoth *E. colombi*) reached a height of 11 ft.; and the Imperial mammoth (*E. imperator*) from 13 feet to 13 feet 6 inches, this being the tallest species of elephant on record. The American mastodon rarely reached 9 feet 6 inches, and was generally about 9 feet. The mastodon, however, is a much more heavily built animal. Mr. Lucas adds, "Referring to the mammoth in the Chicago Academy of Science, it should be said that this specimen has been restored, all the long bones being lengthened, and that the specimen stands nearly two feet higher than it should. It has been painted over, so that it is very difficult to tell where the original bones leave off and the restoration commences. The animal is probably the Colombian mammoth, and it is said that the skull is that of a recent Indian elephant.'

FLOWERING PLANTS.

White variety of *Vicia sepium*.—I have had sent to me by Mr. G. Parkin, of Wakefield, a white flowering variety of this vetch. Mr. Parkin informs me that a large patch bearing white flowers only has occurred for two years at Cold Hiendley.—W. E. L. WATTAM, Newsome.

—:o:—

BIRDS.

Golden Oriole at Gainsborough.—One of these beautiful birds has recently been met with at Gainsborough. It flew against the railway telegraph wires near the town, and was picked up by a workman on the line, who saw it fall, and put in the hands of a local bird-stuffer, from whom I obtained it. I believe the Golden Oriole is not so rare a bird, in these parts at all events, as is generally supposed; for in addition to the one that stayed in my garden for some weeks, in August 1901, and was recorded by me in the 'Naturalist' for that year, p. 292, I have on several other occasions heard of its being seen in this neighbourhood and in other parts of North Lincolnshire; and though these occurrences were not properly authenticated, some of them, in all probability, were correct. The bird I am now recording is a male in perfect plumage, and is in the Lincoln Museum.—F. M. BURTON, Highfield, Gainsborough, 10th August, 1908.

A YORKSHIRE PEREGRINE.

E. W. WADE, M.B.O.U.
Hull.

(PLATE XL.)

On May 30th the photographs of a young Peregrine Falcon (reproduced in this month's journal) were taken on the Bempton Cliffs. This year the birds have come back to the 'Falcon's nest,' last tenanted in 1879, this being the third time that they have shifted their quarters since their return to the cliffs. Probably the restlessness displayed by the birds in their choice of a breeding-site is caused by the inevitable disturbance produced by the cliff-climbing, and the crowd of sight-seers, 'horny-theologists,' and others, who always ask for the Falcons; but as this is a disadvantage in one way, it is an advantage in another, inasmuch as it acts as a protection to the birds, the object of the climbers being to attract visitors, and so obtain a better market for their eggs. It must be recognised by now that the men on whose ground the Falcons breed, have an increased number of visitors, and in course of time the Falcon's nest should come to be regarded as a valuable asset.

This return to an old haunt after the lapse of twenty years is a curious illustration of the persistence shown by many of the Raptores in clinging to breeding-sites formerly tenanted by the same species, even though the actual pair in possession cannot be supposed ever to have had any memories associated with the place, and argues some special advantage possessed by it. In this present case the eyrie is a broad, grassy ledge, well overhung, but unfortunately visible from the cliff top to the E.S.E., whence the solitary young one could be easily made out by the naked eye. When the photograph was taken, the bird was nearly twice as bulky as a Rock-dove, the mature plumage showing black through the white nestling down, and giving it a mottled appearance. It was old enough to scramble along the ledge, and almost elude the camera. A fortnight later it had flown. A few bones and feathers marked the site where the nest had been scratched out, but otherwise, the contents of the hollow had dried to dust, and become indistinguishable.

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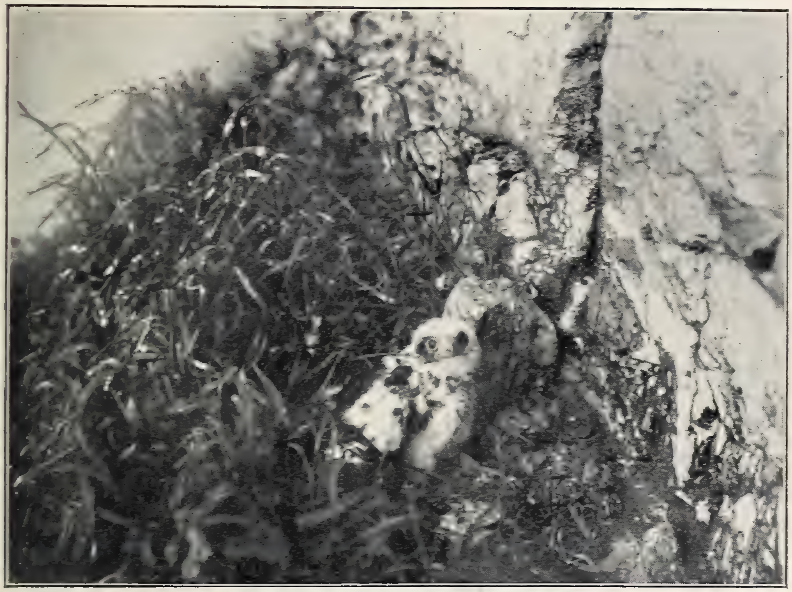
Mr. W. M. Egglestone favours us with a copy of an interesting paper on 'The Occurrence and Commercial Uses of Fluorspar,' reprinted from the 'Transactions of the Institution of Mining Engineers.' From his paper it is evident that the mineral is more widely distributed than is generally supposed.



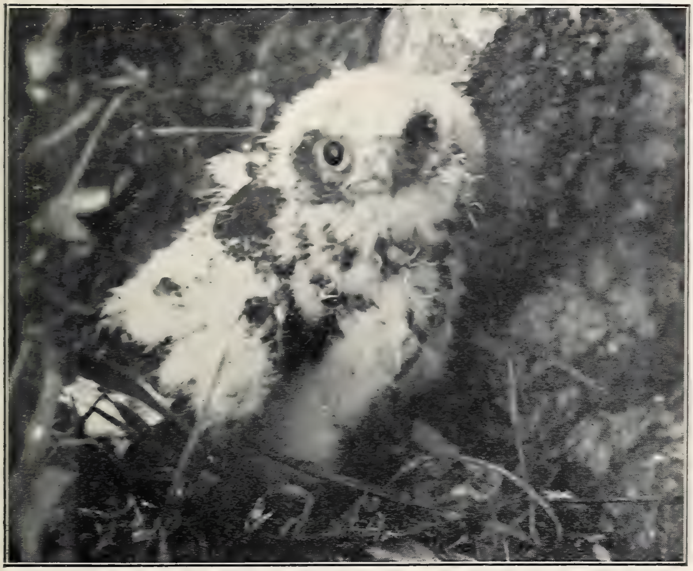


Photo by] [*E. W. Wade.*

Young Peregrine at Bempton.

BRITISH MUSEUM NATURAL HISTORY

THE ORIGIN OF BRITISH 'WILD' CATTLE.

H. E. FORREST.

(*Continued from page 332*).

At a later period, the long-horned race of ox, domesticated by the Romans and other peoples of Europe, probably also originated from *B. primigenius* in a similar way, but, not having passed through so many generations, it retained more of the character of the original type—it had the long horns and straight forehead of *B. primigenius*, whilst in size it was intermediate between that animal and the old domesticated *longifrons.*

It would be quite natural for the invaders of Britain, finding their own oxen so much larger than the native short-horn, to endeavour to improve the breed by bringing over some of their own animals. Amongst these importations would certainly be some of the highly-prized white breed. Prior to the period of the Roman invasion, there is no evidence of the existence of white cattle in Britain ; yet we find that a few centuries later the Celts in Wales had herds of both white and dark cattle, prizing the former most highly. Youatt writes :—' Howell Dha, or Howell the Good, describes some of the cattle in the tenth century as being white with red ears, resembling the wild cattle of Chillingham Castle. An early record speaks of a hundred white cows with red ears being demanded as a compensation for certain offences against the princes both of North and South Wales. If the cattle were of a dark or black colour, a hundred and fifty were to be presented. When the Cambrian princes did homage to the King of England, the same number of cattle, and of the same description, were rendered in acknowment of sovereignty.'

' Speed tells us that Maud de Breos, in order to appease King John, whom her husband had offended, sent to his queen a present from Brecknockshire of four hundred cows and a bull, all white with red ears. . . . The same records that describe the white cattle with red ears, speak also of the dark or black-coloured breed which now exists, and which is general throughout the Principality.'

Now how did the Welsh become possessed of this white race of cattle as well as their original black race ? There seem to be two possible solutions of this question : either they obtained possession of some of the white cattle descended from the Roman breed, and bred from these, or they carefully selected any white animals that happened to appear in their own herds, and bred from those till a white race was established, thus emulating the example of the Romans who 'set the fashion.'

That the original stock whence the modern Park Cattle arose was not white is proved by the fact that in all these herds the cows frequently drop coloured calves—usually black. During the present year a Vaynol cow, mated with a Chartley bull at the 'Zoo,' dropped a black calf; the same pair produced another black calf the previous year. It is notorious that the white colour of the herds has only been kept pure by the care of the keepers in killing all the animals born which were not of the desired hue.

Over anxiety to preserve the purity of the race has led to disaster; several of the herds have died out altogether for want of new blood, and consequent loss of stamina to resist disease—*e.g.*, those at Lyme and Chartley Parks.

At the present time there is probably no herd of White Cattle with better stamina than that at Vaynol, Bangor, owned by Mr. C. G. Assheton Smith. Since writing the brief account of this herd in my 'Fauna of North Wales,' I have obtained full details as to its origin, and these are of special interest as showing how such a herd can be produced in modern times by judicious blending of distinct strains. About the year 1854, the late Sir John P. Orde, of Kilmory House, Argyllshire, purchased a pure-bred bull from Blair Atholl, where the remnant of an old herd of White Cattle was being disposed of—they belonged to the black-eared group. This bull was put to several white Highland cows, and in the course of a few years a small herd of white half-breeds was produced. The cows in this herd were subsequently mated with a pure bull from Lord Breadalbane's (also of Blair Atholl stock), so that the progeny were three-quarter bred Atholl Cattle, and one-quarter Highland. The herd was purchased in 1872 by the late Mr. G. Duff Assheton Smith, and removed to Vaynol. A bull from the Duke of Hamilton's herd at Cadzow was added to the stock in 1896 (not whilst the herd was at Kilmory, as stated by a reviewer in the 'Field'). This bull was not a success, being less hardy than the others, whilst many of his progeny were black or spotted. Prior to his introduction no black calves had appeared and there have been but few since his death.

The only trace of Highland ancestry noticeable in the Vaynol cattle is a certain shagginess about the forehead, and a sturdy look about the limbs, especially the forelegs.

The fact that all white Park Cattle exhibit a tendency to drop black calves occasionally, indicates that the ancestral stock was black. On the other hand, as showing the tendency of cattle generally to produce white calves occasionally, I may mention that, at the time of writing, amongst a lot of 'mongrel' cattle in a field near my house are three cows of a pure creamy white; the rest are red and white.

I append an extract from Pennant's 'History of Quadrupeds' (1793, I. 17), interesting to North-countrymen for its local allusions and quaint diction. Of the cattle at Drumlanrig and Chillingham he writes thus:—'That amiable and worthy man, my respected friend, the late Marmaduke Tunstall, Esq., of Wycliff, Yorkshire, collected several curious particulars respecting this rare breed, which are published in 1790 in a general History of Quadrupeds, illustrated with wooden [*sic!*] plates, cut with uncommon neatness by Thomas Bewick, of Newcastle-upon-Tyne. His ingenuity deserves every encouragement, as his essay is the first attempt to revive with any success that long disused art which was first begun about the year 1448. I take the liberty of inserting here a more ample account of the *Bisontes Scotici* extracted from p. 25 of that little elegant work.' Then follow two pages of descriptions of the cattle, concluding thus:—'Those at Burton Constable, in the County of York, were all destroyed by a distemper a few years since. They varied slightly from those at Chillingham, having black ears and muzzles, and the tips of their tails of the same colour. They were also much larger, many of them weighing sixty stone, probably owing to the richness of the pasturage in Holderness, but generally attributed to the difference of kind between those with black and with red ears, the former of which they studiously endeavoured to preserve. The breed which was at Drumlanrig in Scotland also had black ears.'

I may remark that even in the Chillingham cattle the colour of the ears has not always been constant. At one time many of them had black ears. Uniformity was obtained only by killing all those of the wrong colour.

Local tradition avers that wild cattle formerly inhabited the unenclosed moorland hill district called the Mynydd Bach in mid-Cardiganshire. They were killed by being driven from

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the heights by men armed with scythe-blades fastened to poles, who endeavoured to hamstring the animals as they rushed by. An old gentleman, still residing near Aberystwyth, remembers having seen one of these weapons in his youth, and, from the details which he then heard, the period referred to would be about the middle of the eighteenth century. The colour of these beasts does not appear to have been noted, but domestic cattle pure white, some with black and others with red or brown ears and muzzles, are not at all uncommon in the district at the present day.

At Lamphey Court, Pembrokeshire, there is a herd of long-horned White Cattle so closely resembling the Chartley Cattle, that Mr. J. R. B. Masefield (who first noted the remarkable likeness in 1892), suggested the introduction of some of the Lamphey animals into the Chartley herd, in the hope that the new blood might prevent the impending doom of the old race, reduced to a mere remnant by disease and in-breeding. Had this course been adopted in time, the Chartley Cattle might have been saved. Mr. Masefield tells me that the Lamphey herd was produced by selection of white animals from amongst various herds of Welsh cattle, and breeding from these. None of the stock was related to any of the old herds of White Park Cattle.

In March 1905, the remaining herd at Chartley was purchased from Lord Ferrers by Mr. Masefield, on behalf of the Duke of Bedford, and removed to Woburn. It consisted of eight beasts. Of these, only one, a black bull, now remains, but a bull and cow have been returned to Chartley. The Chartley bulls at Woburn have been mated with white cows of other breeds, and the results are published in the 'Transactions of the North Staffordshire Field Club*.' where full details may be found. Of these experiments, the most striking results were obtained by mating the black Chartley Bull with a white Welsh cow: the calf produced was a quite typical Chartley animal—white with black nose, and black markings on legs. Another calf produced at Chartley by a white Chartley bull and Lamphey cow, was white with black nose and ears, but the legs not marked. By mating a pure Chartley bull with these half-breeds, it is hoped to get back the original Chartley breed as nearly as possible, but, as stated at the beginning of

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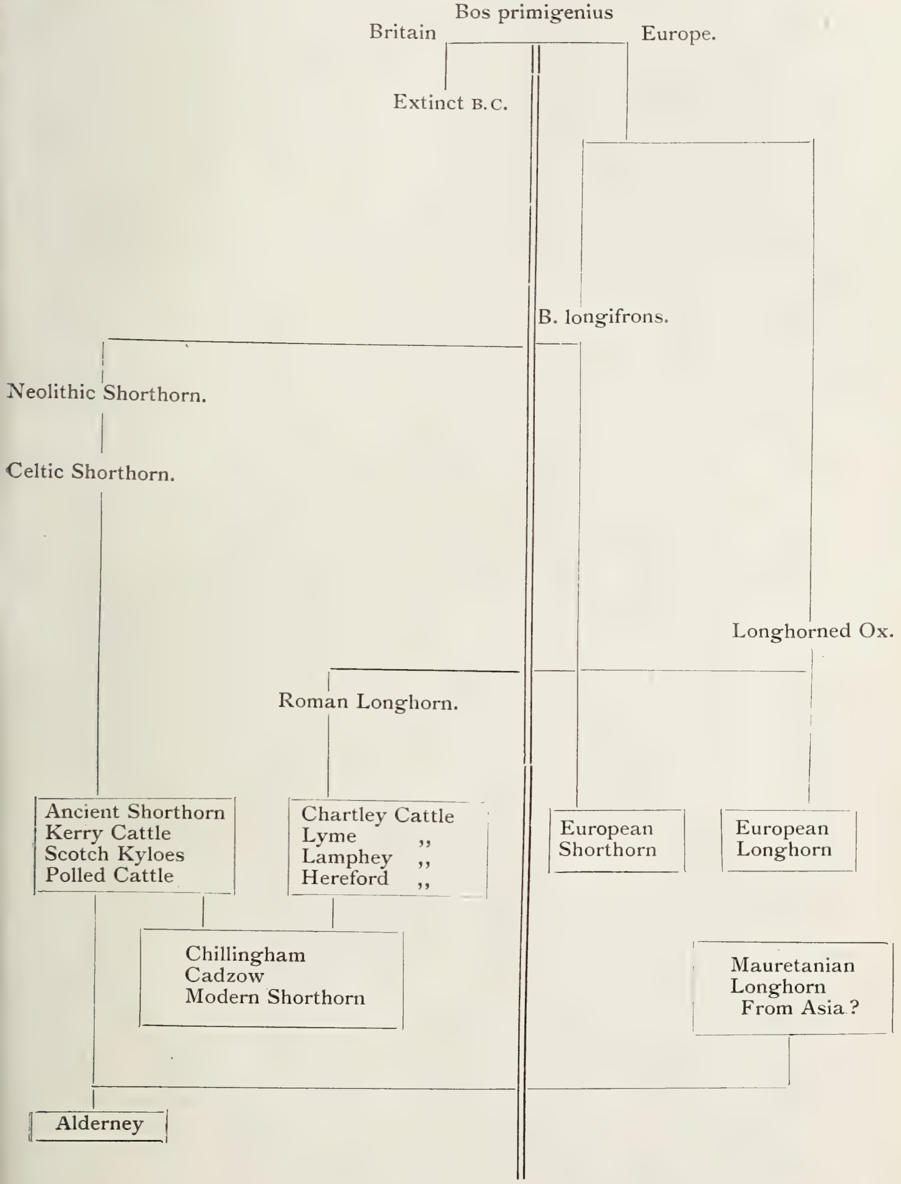
* Vol. XLII., 1908, pp. 61-63.

CHART SHOWING PROBABLE ANCESTRY OF BRITISH CATTLE.



this paper, the original herd is now 'practically' extinct, since the progeny henceforth will be a mixed one. For permission to publish these details I am indebted to Mr. Masefield. I have also to thank Rev. F. C. Barnwell for the photographs of Chartley Cattle; Mr. R. J. Irwin for that of black Welsh cows; Mr. J. Whitaker for that of the skull of Lyme Park breed; Mr. Laisters F. Lort for that of the Vaynol herd; and Captain G. W. Cozens for that of the cow and calf in the 'Zoo.'

◆

Excavation of the Roman Forts at Castleshaw. First interim report, by **F. A. Bruton.** Manchester: Sherratt & Hughes. 37 pp., maps and plates 1/-

This well-printed report contains particulars of the excavations made during 1907 by Mr. S. Andrew and Major W. Lees. The fort at Castleshaw was described, and a plan was published by the Royal Society so long ago as 1751, but no really systematic excavations appear to have been made until recently. Many new and important structural features have been revealed, and several interesting questions have arisen, which it is hoped subsequent excavations will answer. Some beads, spindle whorls, pottery, etc. were found, particular interest centring around a tile with the letters COH IIII BRE. The discussion on this tile, and the comparison made between it and other similarly impressed tiles found elsewhere, constitutes a valuable section of the report. The pamphlet is absurdly cheap at one shilling, and should have a very large sale.

Precious Stones, by **W. Goodchild,** with a chapter on Artificial Stones by Robert Dykes. London: Constable & Co. 309 pp., 6/- net.

The author of this book is the son of our former contributor, the late J. G. Goodchild, and we naturally expect to find a book written with the care and skill so characteristic of his father's work. In this we are not disappointed. Mr. Wilbert Goodchild has produced a book which, as well as containing most that is known of the rarer gems, is thoroughly readable, and can be perused and enjoyed by any one not necessarily particularly interested in the subject. The chapter devoted to the history of precious stones from the earliest times is a fair sample of the thoroughness with which the author has done his work. He also deals with the mode of origin of gems, their physical properties, methods of cutting gems, and imitation gems. These chapters occupy about a quarter of the volume. Then follow detailed accounts of the various precious stones from the diamond to jet! Unfortunately the last sentence in the book is hardly accurate to-day:—'Much of the working of jet is carried on at Whitby'; the Whitby jet trade being almost a thing of the past. A useful glossary and a good index conclude the volume. There are several suitable illustrations.

Coal, by **James Tongue.** London: Constable & Co. 265 pp., 6/- net.

This is bound in uniformity with the volume on 'Precious Stones' referred to above. Mr. Tongue traces the history of the 'black diamond' from pre-historic times to the present day. From thence he turns to its occurrence, and the various theories respecting its origin. The chapters dealing with the fossils [*i.e.*, animal remains] and botany of the coal measures, respectively, are perhaps the most generally interesting, are well-illustrated, and quite up-to-date. Other chapters refer to British and Foreign Coalfields, the classification and valuation of coal, uses and waste of coal, its preparation for the market, and the production of heat from coal. The final chapter refers to the coaling stations of the world The book is excellently illustrated, and there is a useful index.

THE BIOLOGY OF THE PROPAGATIVE BUDS OF *MALAXIS PALUDOSA.*

WILFRID ROBINSON,
Hull.

(PLATE XLI.).

EVERYONE who has gathered or observed *Malaxis paludosa*, the smallest of our British orchids, must have been struck by the singular appearance of the leaves which bear on and near their margin towards the apex tiny swollen bodies, which, on examination by reflected light, under a low power microscope have the appearance of buds (fig. 2 *b*). The position of these, in itself an unusual one for such bodies, together with the idea of obtaining some knowledge of the facts of their structure and development, and a better understanding of their true morphological nature and biological value, suggested the present study.

The material used I gathered from three separate stations, all peaty sphagnum runnels, near Killin (Perthshire), in August of the present year. It was killed and fixed in the field, embedded in paraffin, and sections were stained with Benda's iron hæmatoxylin.

The buds (fig. 2) already referred to, have been variously described. For example, Smith (*c*), in describing the drawings for English Botany (Sowerby), says : ' Leaves should be a little rough at the tip, as I have done them—they are minute teeth, not hairs.' But for many years it has been recognised they are of the nature of buds and their function, that of vegetative propagation. When in a fairly advanced state of development, I found them to consist, as Kerner (*a*), states, of an outer large-celled envelope, which encloses a more compact central body, In median longitudinal section (fig. 4), the envelope is seen to be of two to four cells in thickness, and arches over or completely encloses the rounded interior body. This latter in the earliest stages (fig. 5) to be seen in my preparations, I found was made up of about four axial rows of very regular cells, much smaller than those of the outer envelope, and with large nuclei, each of which showed a distinct nucleolus. The next stage (fig. 6), shewed towards the upper portion of this central mass, some of the cells in active division ; and, owing to the greater growth of the middle portion, the body had now assumed a more or less rounded upper portion, with a basal region of four to sixteen cells. These did not seem to manifest the same meristematic activity as the upper portion. The exact shape about this stage seemed to be somewhat variable, and the interior body was sometimes more elongated, the basal portion being separated from the upper by a slight constriction (*cf.* fig. 7). Presumably these basal cells serve as a kind of haustorium or absorptive organ. Active division was seen in progress, both in nuclei of the cells of the central body, and of the outer envelope. The number of chromosomes estimated was twenty.

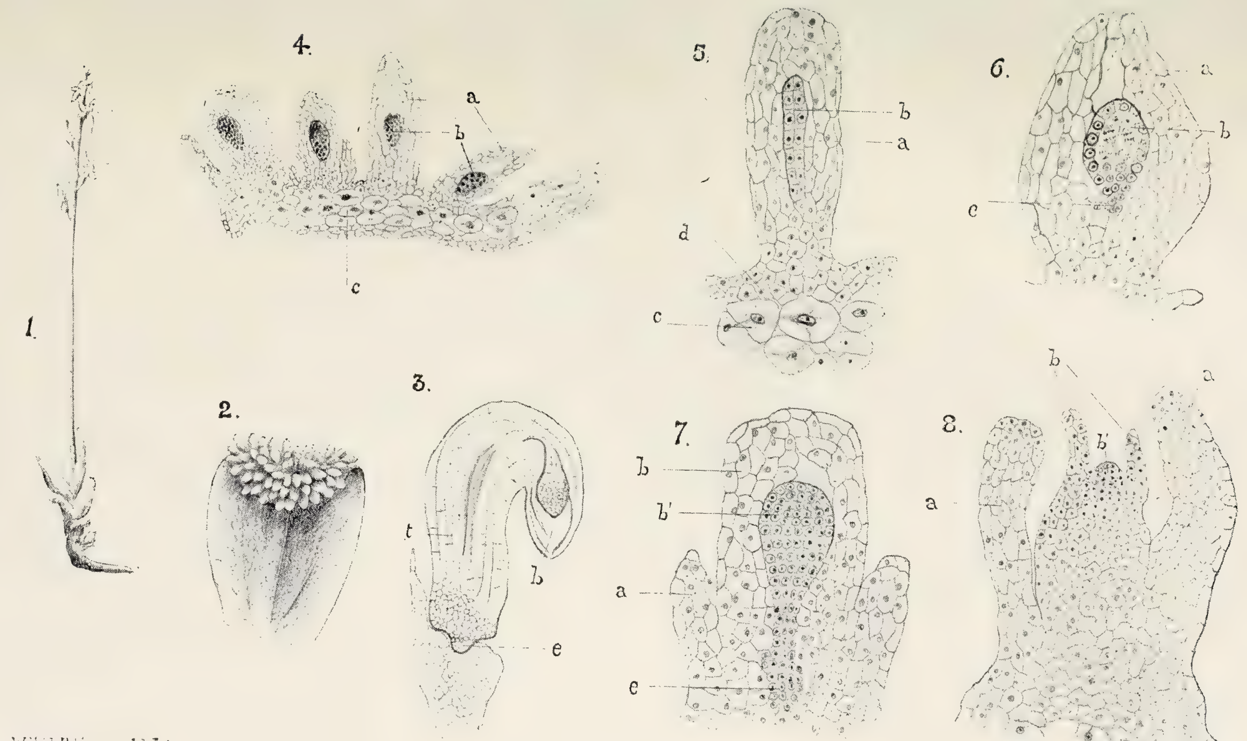
By the division of some of the peripheral cells of the central body, new enveloping leaves originated, and in some cases (fig. 7) at this stage the interior portion had outstripped the growth of the original envelope. Even now the basal haustorial region of the central body was clearly distinguished, it having enlarged somewhat. A later stage still (fig. 8), shewed conclusively the nature of the envelope, for here, two pairs of enveloping *leaves*, clearly alternate, surrounded an actively dividing vegetative apex. Further, in this case the apical portion of all four leaves was very evidently meristematic, and in active division. This is an important fact, for it gives the clue to the ultimate origin of these vegetative buds on the apical regions of the leaves. This origin is rendered possible by the cells of the apical region of the leaf retaining their meristematic activity after unfolding. In the stage seen in fig. 8, the basal region was not now recognisable.

The mesophyll cells underlying the developing buds (fig. 5 *c*), were very large, and more rounded than the ordinary cells of the mesophyll. They had extremely large nuclei, and distinct nucleoli, as well as dense, protoplasmic contents. These probably play an important part in the nutrition of the growing buds. Vascular strands were not observed to reach tissue just below the buds.

Kerner (*a*) has remarked that these buds are singularly like seeds in external appearance ; but he goes on to say, they merely give rise to tubers on germination. The resemblance of the developing buds to the developing embryos of various monocotyledons is very remarkable. The morphological resemblance is probably a mere analogy, but does not seem to me to be altogether surprising in view of the fact that both embryo and propagative bud, though of widely different origin, serve the same biological function—the propagation of the species.

In the Pteridophytes, Bower (*b*) remarks on a like striking similarity between the *tuber* of Phylloglossum, which provides for its yearly growth, and the *embryo* of the same plant.

Further, whilst lacking the stimulus and advantages of fertilisation, the sporophytic buds, as we must regard these



W. Wilfrid Robinson del. 7 '08.

Malaxis paludosa.

BRITISH MUSEUM NATURAL HISTORY

bodies morphologically, are eminently better fitted to survive and germinate successfully than are the tiny seeds; and we assume (although this requires special investigation), that these sporophytic buds are the general mode of reproduction, and the seeds only very rarely succeed in raising new plants. This assumption would account for the very localised occurrence of this plant in its habitat. The three stations, where the specimens now used were gathered, were small pieces of bog, a few yards square in each case, and in one of them, although fifty plants were counted in four square yards, scarcely a single other specimen could be seen in the near vicinity in sphagnum bog of exactly the same character. Naturally, the buds, when released from the leaf, fall and germinate very near to the parent plant. The tuber which enables the plant to perennate generally also multiplies by giving off one or two lateral buds. In a longitudinal section (fig. 3), through such a bud, a general similarity to the smaller propagative leaf buds was noted. Especially characteristic was the massive tuberous base, with a lower foot-like projection in contact with the parent tuber.

Kerner (*a*) states that the propagative buds germinate to form tubers, but from the fact that my preparations (fig. 8) shew the apical portion in active division, I think it likely that the apical portion retains this activity, and ultimately gives rise to the growing point of the new shoot, notwithstanding the intervening tuber formation.

LITERATURE CITED.

a.—Kerner—Natural History of Plants.

b.—F. O. Bower—The Origin of a Land Flora.

c.—Garry—Notes on the drawings for English Botany. —*Supplement to Journal of Botany.*

EXPLANATION OF FIGURES.

1.—Whole plant of *Malaxis paludosa* × $\frac{2}{3}$

2.—The apical portion of a leaf shewing recurved apex bearing propagative buds × 15.

3.—Median longitudinal section of a lateral bud on tuber × 50. t = tuberous base; e = ' foot-like organ; b = bud.

4.—Median longitudinal section through apical portion of a leaf, shewing four buds attached to the leaf × 80. a = outer envelope; b = central compact body; c = large specialised mesophyll cells,

5.—Radial longitudinal section through a very young bud × 160. a = envelope; b = central body; c = specialised mesophyll cells; d = meristematic cells at the base of the bud.

6.—Median longitudinal section through a slightly older bud, shewing spindles of nuclei in division × 160. a = envelope; b = central body; e = specialised basal region of b.

7.—A similar section to (6) through an older bud × 160. Lettering as before. b = central body; $b1$ = second envelope.

8.—A longitudinal section of a still older bud, shewing meristematic leaf apices a and b and central apical region, $b1$ also meristematic × 160.

1908 October 1.

NEW PLANT-LOCALITIES FROM NORTH-EAST YORKSHIRE.

J. G. BAKER, F.R.S.,
K.w.

LEPIDIUM LATIFOLIUM. South side of the stream at East Row, near its mouth.

SINAPIS NIGRA. Abundant at Robin Hood's Bay.

BRASSICA OLERACEA. Cliff above the entrance to the North Pier at Whitby.

VICIA SYLVATICA. Plentiful near the sea at Hayburn Wyke, and between Staithes and Runswick Bay.

ROSA MOLLIS. High up in East Row Woods.

ROSA MOLLIS var. CŒRULEA. Whitby and Scarborough Road, near Hayburn Wyke.

ROSA SCABRIUSCULA. With the last.

ROSA URBICA. Hayburn Wyke.

ROSA ARVENSIS. High up in East Row Woods.

RUBUS CINEROSUS Rogers. Abundant at Hayburn Wyke, both in the woods and by roadsides. So far as is known, this is an endemic English species. It was first described by the Rev. W. M. Rogers, from several stations near Helmsley and Rievaulx.

RUBUS LEUCOSTACHYS and R. RADULA. East Row Wood.

RUBUS DUMETORUM. Hedges between Sandsend and Lythe.

SMYRNIUM OLUSATRUM. Plentiful at Runswick Bay.

INULA HELENIUM. Still plentiful at Runswick Bay, where it was first found by Mr. Geo. Massee.

SONCHUS ASPER. About the old castle at Mulgrave.

ARCTIUM INTERMEDIUM. Mulgrave Woods.

CARDUUS TENUIFLORUS. Waste ground at East Row.

PLANTAGO MARITIMA. Foot of the coast cliff south of East Row.

EPIPACTIS LATIFOLIA. Woods at Hayburn Wyke.

LUZULA SYLVATICA. Abundant in the oak woods that slope down to the sea at Hayburn Wyke, with AIRA FLEXUOSA and MELAMPYRUM PRATENSE.

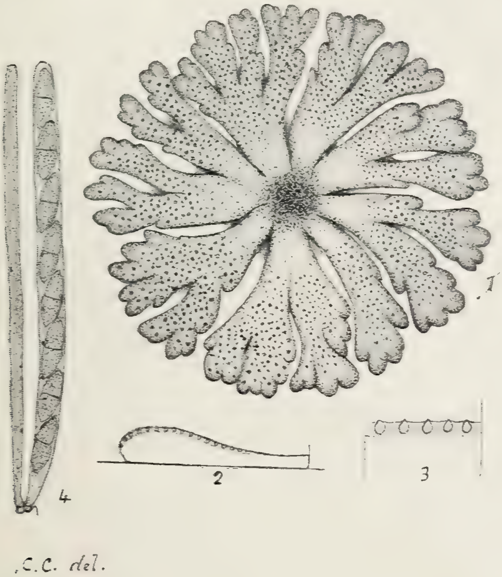
CALAMAGROSTIS EPIGEIOS. Very fine in a swamp just inside the East Row gate of Mulgrave Park.

TRITICUM ACUTUM. Banks of the East Row stream near its mouth.

HYPOCREA RICCIOIDES (BOLT.) BERK. [*SPHÆRIA RICCIOIDES* BOLTON] IN WESTMORLAND.

C. CROSSLAND, F.L.S.

THIS very rare and peculiar Pyrenomycete was gathered on the 12th May last by Messrs. J. A. Wheldon and A. Wilson. They noticed it growing plentifully on apparently healthy willows along the sides of ditches bordering the road between Dungeon Ghyll and Elter Water, Great Langdale, Westmorland. They kindly forwarded specimens to the writer, who was very pleased to see them; more so perhaps because this rare fungus was first found near Halifax. It was discovered by Bolton 'on decaying branches of sallow and hazle in February 1790,' and figured and described on the last plate (182) of his 'History of Fungusses growing about Halifax.' There are specimens in the Kew Herbarium from Glamis, Perthshire, collected by the



Hypocrea riccioides **(Bolt.) Berk.**

Fig. 1.—Stroma, natural size; surface view, the dots representing perithecia are perhaps fewer, and wider apart, than in nature.
Fig. 2.—Vertical section of portion of same.
Fig. 3.—Portion of section magnified.
Fig. 4.—Ascus, spores, and paraphyse magnified 320.

Rev. M. J. Berkley on Salix in 1878; from Corby Castle (Lincolnshire), collected by Dr. Carlisle in the years 1883-4-5-6; and Mr. Massee has specimens from the New Forest. These are all the British specimens that have come within my knowledge up to present. The Herbarium also contains continental specimens (Swedish, Danish, and French) of recent date.

Not having had the pleasure of seeing the fungus before, the opportunity of making an independent diagonosis and figure from the freshly-gathered plants was not allowed to slip by. The characters are as follow:—

Stroma growing in circles, 8-10 c.m. across, branched, branches radiating from a common centre, and closely adhering to the decaying bark or wood by the whole of their under surface, bi- or trifid, ends irregularly lobed, pale fulvous brown, or inclined to orange in colour, darkening towards the centre, surface minutely tubercled with the projecting ostiola of the perthecia, substance fleshy, firm but not coriaceous, whitish, 4-6 m.m. thick; perithecia immersed subglobose; asci cylindrical $170\text{-}180 \times 10\ \mu$, walls thin and clinging close to the spores; spores 8, hyaline, slightly oblique, 1 seriate with ends only overlapping, smooth, oblong fusiform, $24\text{-}30 \times 8\text{-}9\ \mu$, one septate, slightly constricted at the septum, contents minutely indistinctly granular; paraphyses cylindrical, ends truncate, aseptate, hyaline, contents striate granular, about length of asci.

The stroma cracks a little on drying, and becomes dark red brown. Spores (no asci) are extruded from the dry perithecia, and lie in little white heaps jnst outside the ostiola.

Bolton refers to a greenish powder on the plants, especially when they become old. There was also a greenish powdery deposit on the present specimens, which proved to be *Pleurococcus vulgaris.* Most likely the same alga would form the deposit noticed by Bolton.

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Some interesting information in reference to the subsidence of fen soil as a result of drainage, etc., is given in ‘Fenland Notes and Queries’ for July.

The Spalding Gentlemen's Society propose to build a museum for the reception of its treasures, in celebration of their bi-centenary. Nearly £500 has been subscribed for the purpose.

In ‘A note on some Chalk Crinoids’ in the August ‘Geological Magazine,’ Mr. J. A. Douglas figures and describes *Roveacrinus alata, R. communis,* and *R. communis* var. *rugosa.* The specimens were collected in Sussex by Dr. Rowe, after whom the new genus takes its name.

THE HALIFAX POTAMOGETON.*

A. BENNETT, F.L.S.,
Croydon.

(The '!' following a record indicates that I have seen the species).

Potamogeton pensylvanicus Cham et Sch. Linnæa, ii. (1827), 227.!

P. pumilus Wolfg. Roem et Sch. Mant iii. (1827) 354.!

P. Claytonii Tuck. Am. Jour. Scie. and Arts 1st ser., xiv. (1843), 38.!

P. epihydrum Rafin. Med. Rep. 2nd Hex. v. (1808), 354.

P. Nuttalii Cham et Sch. lc. 226 teste Morong.

Descrip. Morong. Mon. N. Am. Naid. t. xxix. (1893), 18.

'Stems slender, compressed, mostly simple, generally from 1 to 3 feet high, but sometimes 6 feet, according to the depth of the water in which it grows. Floating leaves elliptical, sometimes obovate, obtuse at the apex, sloping at the base into a short petiole 1½–3½ inches long, and 4–12 lines wide, 12–27 nerved. These leaves sometimes number as many as 4 or 5 pairs at several inches distance from each other in the upper part of the stem. Submerged leaves linear, 2–ranked, 2–7 inches in length, and 1–3 lines in width, 5–nerved, the 2 inter lateral nerves nearly marginal, the space between the two inner and the midrib evenly and coarsely cellular reticulated. In young plants the submerged leaves are often crowded close together, the internodes afterwards elongating. Stipules obtuse, hyaline, nerved, keelless. Peduncules about the thickness of the stem, 1–3 inches long. Spikes ½–1 inch long, fruiting freely. Fruit roundish-obovate, 1¼–1¾ lines long, by 1–1½ lines broad, 3-keeled, middle keel sharp, the sides flat, and distinctly impressed; style short, apical, embryo coiled 1⅓ times.

There is a very large form of it—*P. Nuttalii* var. *Cayugaensis* Wiegand,! occurring in New York and Canada.†

In Canada it is distributed from British Columbia! across to Upper Canada,! and from Lake Superior north to Sable Island,! 44° N. Lat., and Lake St. John, 49° N. Lat. In U.S.A., from Maine! south to Georgia,! and from Massachusets! west to California, and Washington Ter.!; also in Porto Rico! and Jamaica.!

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* See 'The Naturalist,' January, 1908, pp. 10-11.

† What appears to be another introduction from North America is the recent discovery of *Sagittaria heterophylla* Pursh. in the river Exe in Devonshire.

Roughly it may be described as *P. zosterifolius* (but with its leaves pellucid) submerged; and floating leaves similar to *P. heterophyllus* Schreb.

The oldest specimens I know of in Europe are in De Candolle's herb. from 'Carolina, Rugel, 1841,' as '*P. fluitans* Auct. Am.' and in Mr. Melvill's from 'New Jersey, 1841, Kilvington' as *P. heterophyllus;* though there is one that is probably much older from Rafinesque in the Delessert herbarium at Geneva as *P. fluitans*, no date.

Dr. Graebner, in his monograph of the genus in Engler's Das Pflanzenreich Heft 31, 1907, places this species between *P. Cheesemanii* Ar. Benn. and *P. scelerocarpus* Schumn, and the nearest British species it comes to in his account is *P. natans* L., though there are 15 species between *natans* and *Cheesemanii*. But, until the whole genus has been studied anatomically in conjunction with morphological and other characters, the position of many species must be held to be only tentative. Whilst we must 'faggot' our species, it must be admitted they are far from being finally arranged.

In June, Miss A. E. Vigurs kindly sent me a box of fresh specimens, these were just showing the peduncules and spikes, and remarks: 'I discovered a fresh patch of it yesterday (21st) about three miles away, between Salterhebble and Elland, but the water is very dirty just there, so the plants are not nice as specimens. There does not seem to be nearly as much as last year."

Mr. Fernald has sent me a note respecting the species (see below). Miss Vigurs considers the opinion he expresses untenable, and I agree with her, and she remarks: 'I am glad that Mr. Fernald says it is only a "tentative answer," as I feel sure this Pondweed is an introduction. This plant grows exactly at the spot where the water from the Cotton Mill enters the Canal, that is an absolute fact which I can vouch for.'

The species being found in a canal in a manufacturing centre, it seems not allowable to regard it as a native. The supposed instance of introduction of *P. crispus* L. to N. America named by Mr. Fernald, I believe cannot be upheld. Dr. Morong, in his monograph had forgotten the reference of Pursh in his 'Fl. Amer. Scptr,' I., (1814) 121, when he says 'Canada to Virginia,' and puts a v.v. to it, in that he had seen living specimens, and he refers to ‘Fl. Danica’ t. 927, and Curtiss's ‘Fl. Lond.’, 5 t. 15. Specimens of *crispus* are extant in British Herbaria, with dates c. 1832, ! 1841, ! 2nd 1842, ! and it is given by Kunth in his Enum 3, 134, 1841, for ‘America borealis’ *P. crispus* is distributed all over the world, but is very rare in S. America, in the Argentine Republic (Maslock expedition).

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NOTES ON *POTAMOGETON PENSYLVANICUS* CHAM.

Prof. M. L. FERNALD,
Harvard, U.S.A.

‘*Potamogeton epihydrum* Rafin. (*P. pensylvanicus* Cham, *P. Claytoni* Tuck) is one of the commonest, if not absolutely the commonest species from the Gulf of St. Lawrence southward, and there is hardly a pond or sluggish stream in the Eastern United States where it does not grow. Consequently its fruit could easily have got into manufactured goods at almost any mill pond. But I cannot help wondering if your Yorkshire plant may not be native. Here are my reasons:—There are few if any clearly introduced Pondweeds. *P. crispus* is doubtfully native here, occurring very rarely away from the larger settlements, and usually only in more or less artificial ponds. Otherwise, I know of no introductions in America.

‘Nearly all your Potamogetons of Great Britain are native through the North Eastern United States and Canada, where they are associated with *P. epihydrum* (*P. pensylvanicus*). We have *P. natans, polygonifolius, alpinus, heterophyllus, nitens, lucens, zizii, praelongus, perfoliatus, crispus, acutifolius, compressus, obtusifolius, pusillus, Friesii, rutilus, pectinatus, filiformis*, etc., and a few endemic species. Now, in my experience in the field, I find very few of these species ascending to the alpine ponds at the mouth of the River St. Lawrence; but in the alpine waters on Table-top Mt. (7250 feet) in Gaspi Co., Quebec, there occur *P. epihydrum* and *P. pusillus* along with *Subularia aquatica* and *Sparganium angustifolium* Michx (S, *affine* Schnitzl.). The alpine plants of the adjacent bays and ledges are circumpolar species, or, at least, plants of the colder parts of Europe and adjacent Asia, such as *Viola palustris, Silene acaulis, Cerastium cerastioides, Sibbaldia procumbens, Rubus Chamæmorus, Epilobium alpinum, Gnaphalium nor-*

vegicum, Arctostaphylus alpina, Phyllodoce caerulea, Vaccinium uliginosum, Salix herbacea, Spiranthes Romanzoffiana, Listera cordata, Tofieldia palustris, Juncus castaneus, Luzula spicata, Scirpus caespitosus, Carex pauciflora, C. canescens, C. rigida, C. aquatilis, C. vaginata, C. rariflora, C. capillaris, C. Oederi, C. saxatilis, Phleum alpinum, Calamagrostis neglecta, Poa alpina, Lycopodium alpinum, L. Selago, Selaginella selaginoides, Polystichum Lonchitis, Cystopteris montana, ect.

It has seemed to me from the fact that *Potamogeton epihydrum* does ascend to alpine regions of Eastern Quebec, where it is associated with hundreds of truly circumpolar species, that this species is probably more northern than we have given it credit for. We know nothing, essentially, of the Pondweeds from north of the Gulf of St. Lawrence, but the species with which this one occurs on Tabletop Mt. are all known from Labrador and northward, and I shall expect to find *P. epihydrum* this summer, when I shall spend three months between the Straits of Belle Isle and Hudson Strait, a region of arctic and sub-arctic flora.

' Your *P. polygonifolius, P. nitens, acutifolius, rutilus,* and some others are known from very few (often only one or two) stations on this side of the Atlantic. May not the Halifax station for *P. epihydum* be a similarly isolated station for a common North American plant, comparable with four stations for *Ranunculus reptans, Potentilla fruticosa, Moneses uniflora, Euphrasia latifolia, Liparis Loiselii, Spiranthes Romanzoffiana, Sisyrinchium angustifolium, Juncus filiformis, J. tenuis, Scheuchzeria palustris, Najas flexilis, Eriocaulon articulatum, Scirpus americanus, S. nanus, Eriophorum gracile, Scirpus hudsonianus* (*Eriophorum alpinum*), *Carex chordorrhiza, Hierochloe odorata, Aspidium* (*Dryopteris*), *cristatum,* etc., most of which we count among our very commonest plants, but which I understand are very local (like *Potamogeton epihydrum*) with you ?

' This is only a tentative answer, for I may not be able to turn up *P. epihydrus* in Labrador this summer, but its alpine occurrence Gaspé suggests its polar origin.'

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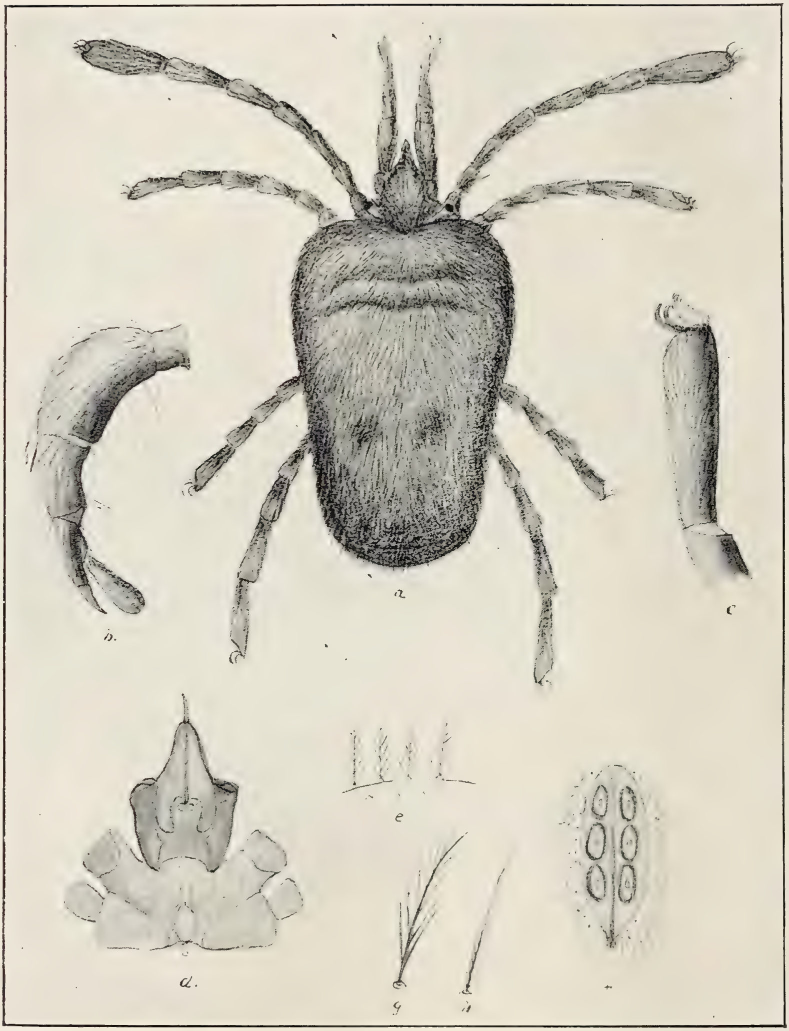
The Rev. W. C. Hey gives a list of thirty-two species of *Hydropori* found near West Ayton, Yorks., in the July ' Entomologist's Magazine.'

The Presidential Address of Dr. Jonathan Hutchinson, F.R.S. to the Museums' Association, is printed in the ' Museums' Journal ' for July. It is ' On Museum Education.'

MUSEUM



Trombidium fuliginosum.

a. Dorsal surface. Length 3.64 m.m.; Breadth 2.24 mm.
b. Palpus.
c. End joint of leg showing foot pad.
d. Anterior part of mite showing crista.
e Hairs on body.
f. Female genital opening.
g and *h.* Two hairs more highly magnified.

SOME BRITISH EARTHMITES.

Trombidiidae (*Continued from page 336*).

C. F. GEORGE,
Kirton-in-Lindsey.

Trombidium fuliginosum Hermann. 1804.

This mite appears to be the next best known species of this family, it is in size rather smaller than *holosericeum*, not so square in figure, but longer in proportion to its width, also the posterior edge is convex outwards, and not emarginate. In colour, it is rather dull red, and does not possess that silky lustre, which makes *holosericeum* so handsome in a bright light; the skin is covered with a dense pile of hair, or papillæ, each one is rather thickly pinnate, but is not clubbed or curved as in *holosericeum* (figures E. G. and H.) They should be examined by a fairly high power. The eyes are long pear-shaped, and each one is furnished with two ocelli.

The palpi have the second joint rather slender, but in other respects much like those of *holosericeum*. The legs also are similar, but differ in having at their distal end, between the claws, a very beautiful and curious foot pad, reminding one of the feet of certain flies (fig. C).

The female genital aperture is furnished within with six genital discs, three on each side, well shewn in Mr. Soar's drawing (fig. F,) but perhaps the most remarkable structural arrangement is the chitine of the crista, which is somewhat shield shaped, and has three perforations, the lower one large and oval, in the centre, and the two upper ones rather small, one in each corner (fig. D). It is rather difficult to describe so as to give a clear idea of its structure, and should be carefully examined under the microscope. Professor Sig Thor gives an enlarged figure of it in his paper, and considers the mite to be a variety of *fuliginosum*, and calls it "var. *norvegicum*." Professor Ivar Trägårdh also, in his pamphlet on the results of the Swedish Zoological Expedition to Egypt and the White Nile, 1901, gives a similar figure from a mite found under a stone near Cairo, to which Professor Berlese has given the name of *Allothrombium pergrande*. Miss and Mr. Soar found this mite at Putney; Mr. W. Evans of Edinburgh found it at Duddington Loch; and Miss Nicholson in Gloucestershire, to whom I am indebted for specimens. The mite is evidently widely distributed.

ON *ERIGONE SPINOSA* CAMBR.

A Spider new to the British Fauna.

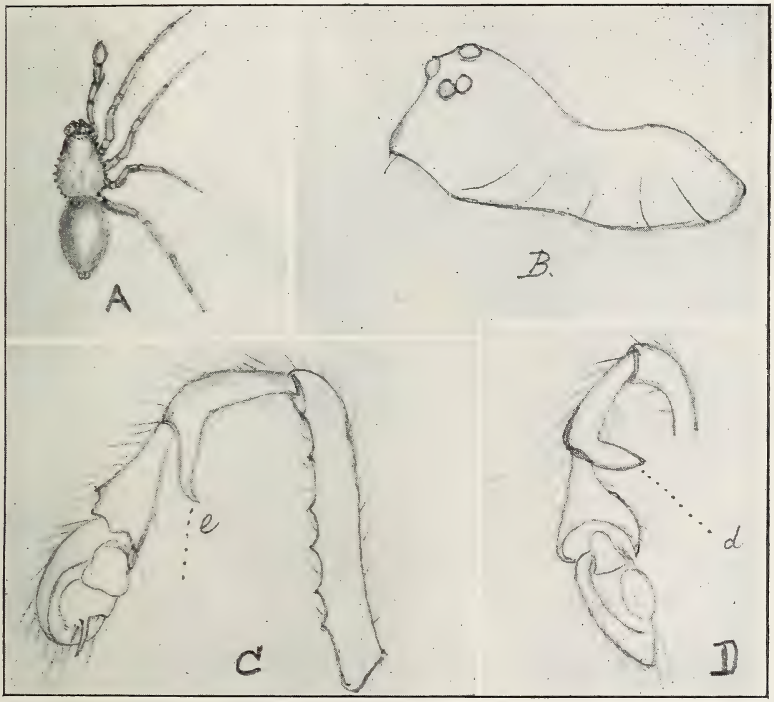
Rev. O. PICKARD-CAMBRIDGE, M.A., F.R.S., etc.

Order Araneidea.
Fam. Theridiidæ.
Genus *Erigone* Sav.

Erigone spinosa Camb. 'Proc. Zool. Soc. of London,' 1872. page 292, pl. xiii., fig. 12.

Syn. *Erigone vagans* Sim. (non *Erigone vagans* Aud. & Sav.). 'Les Arachnides de France,' Vol. V., p. 530, 1881. Figs. 330-331.

Few additions of spiders to our British list have been less expected, or more welcome to me than the one above named. It was almost the first species I bottled on my arrival at Cairo, in January 1864. Others were subsequently found there, and at Alexandria; and I met with it in the following year in Palestine, on the road between Jezreel and Nazareth, and afterwards at Rome. Mons. Simon also sent it to me in 1871 from the neighbourhood of Paris, and I now find both sexes of it among other spiders kindly collected for me on Saltend Common, a few miles from Hull, by Mr. T. Stainforth, of the Hull Municipal Museum. The genus *Erigone* Sav. is one of the best marked, and most compact among our small spiders; its British representatives are few—five only, as recorded at present, not counting the one now under consideration—and among them are two of our most abundant spiders. The most casual observer would hardly fail to recognise the adult males in this group by their black hue, bright yellow-brown or orange legs, and excessively long palpi. The species are most numerous in Alpine and sub-alpine regions. They reach northward in Europe from Cairo to the extreme arctic line, and there are several species also recorded in North America. While, however, the males are tolerably easy to identify, the females are—some, at any rate—difficult to separate. Of the five already recorded British species, four are found in the same locality as the one now recorded, and the fifth in another Yorkshire locality; but the present species—*E. spinosa*—may easily be distinguished in the male sex by its bright orange-red falces, palpi and femoral leg-joints, the colour in these last forming a very strong contrast with the pale yellow-brown anterior joints. No other species known to me has the above-mentioned parts of the same red-tint. When examined closely, also, the form and direction of a strong prominent spur beneath the fore extremity of the third or cubital joint makes it a very easy one to identify. In all other known species, so far as I am aware, this spur is straight, more or less subconical in form, and projects downwards either perpendicularly or with a slight backward direction, whereas in *E. spinosa,* this spur is strongly directed forward, and has a perceptible curve in its anterior portion. Of course there are other specific differences also from the known species, but those mentioned are sufficient for the present notice. The female does not offer the distinctions named in respect to the other sex, excepting in a slight degree, but the female may be separated from that of other species without difficulty by the usual sexual test. It will be gathered, no doubt, from what has been observed above, that *E. spinosa* is one of our minute spiders but not by any means the smallest, nor anything like it. The length of the male is a little over one line, while the female is slightly longer. There is, however, some variation in the size of different individuals of other species of Erigone, and there is the same also in the foreign examples of this species. It can hardly be doubted but that a little careful collecting in the locality where the examples recorded now were found, would turn it up again and very possibly in fair abundance.



***Erigone spinosa* Camb.** ♂

EXPLANATION OF DRAWINGS.

A.—Full fig. B.—Profile. C., D.—Palpus (in two positions)—*b*, *c*, Spur on cubital joint *f*, Natural length of spider. E.—Palpus of another species—*Erigone atro* Bl.—*e*, Spur on cubital joint.

1908 October 1.

YORKSHIRE NATURALISTS AT HAMPOLE.

THE Yorkshire Naturalists' Union, which spreads its attentions in turn over every part of the county, devoted Thursday, July 9th, to a visit to Hampole, near Doncaster. The village was once the site of a little Cistercian nunnery ; one, however, which has never gained quite the same fame as Kirklees and Esholt. But it must have had in reality a beauty of situation hardly less inferior, standing as it did under a steep hillside, richly wooded, and in the midst of a most fertile country.

The Magnesian limestone, which forms the hillside, and underlies the surrounding country, is famous among botanists for the richness of its vegetation, and Hampole and its surrounding villages, though but little known to the seeker after the picturesque, are really of considerable beauty. Unfortunately, either from the inconvenience of a mid-week excursion, or the uncertain and unpromising weather, the attendance was probably the smallest which has attended a meeting of the Union for a considerable period. Those members, however, who attended were rewarded with a day of much delight, for the weather was exquisite, the scenery enjoyable, and the scientific interests considerable and varied. Assembling at Doncaster Station, and proceeding to Hampole by train, the members scattered, and spent the whole day within a few miles of the village, pursuing in woodland or hedgerow or quarry their own branches of study.

The geologists made a round of the quarries between Hampole and Hooton Pagnell, finding the one characteristic fossil of the district, *Schizodus obscurus*—always in a bad condition. A much more interesting geological feature was a section of the beds of the limestone seen in the railway cutting near Hampole Station. The even course of the beds is interfered with by a small fault, and on one side of this fault the beds present the appearance of a huge capital S laid upon its side, some of the apparent contortions being of a most remarkable character. It was, however, but a trap which nature and the railway engineers had laid for the unwary geologist, for on closer study, the magnificent ' contortions ' became much more simple. The limestone is standing at an angle of about 45 degrees, and had there undergone a slight doming. The railway embankment at a somewhat less steep angle than the beds, had bared a portion of the dome of limestone, revealing its various strata in most interesting and puzzling forms.

The botanists found the rains of the previous two or three days inadequate to repair the damage done to the wild flowers by the long-continuous drought. The most interesting plant found was *Veronica montana*—a highland species of the speedwell. It was notable also that throughout the district the ordinary germander speedwell is almost entirely supplanted by the *Veronica Tournfortii*—a foreigner which had doubtless been imported with corn seed. A rare medick (*Medicago denticulata*) was also discovered, which probably had a similar history of importation. In a wood by the roadside was ploughman's spikenard, and in the hedgerows, in beautiful flower, the white bryony—a lovely and delicate plant seldom venturing off the Magnesian Limestone. Here and there were fine heads of the beautiful *Campanula glomerata*, and the rich purple blossoms of the musk thistle made a feature of special beauty. The wild mignonette was noted, and the great hedge bedstraw (*Galium Mollugo*) was also seen in flower. It was unexpected, however, that no orchis but the spotted species should be visible, though this was found in many varieties of colour from pure white to deep purple. The milk vetch (*Astragallus glycyphyllos*) was another interesting and characteristic plant, which it was a pleasure to see. The rarest find of the day was a rush—*Juncus compressus*—which constituted a new record for the district.

The ornithologists had a pleasant day in the woodlands. Although the district is one where game-preserving is followed with the utmost stringency, and everything is sacrificed to the sacred pheasant and partridge, it was interesting to ascertain that not all the efforts of the game keepers had been able quite to exterminate the birds of prey, for the sparrowhawk and the kestrel were observed. The turtle-dove, which finds in that locality its most northerly range, was heard, but the most interesting sight to the students of bird life coming from the north was the long-tailed tits. In Bolton Woods and other good West Yorkshire centres of observation, a sight of the bird is an event of note. Here in the neighbourhood of Hampole they seemed common, and Mr. W. H. Parkin spent a considerable time in the close observation of three large family parties, and of a family of marsh tits. The spotted fly-catcher was ubiquitous. The cuckoo was also heard, despite the old rhyme which terminates its 'tune' in the middle of June; altogether about 35 species of birds were observed. The absence of several species which might reasonably be expected to be plentiful was noticeable, as for instance the yellow wagtail and the corn bunting, the country being particularly suitable for both species. Spotted fly-catchers were very plentiful. The presence of wood-peckers was detected by their work on the trees, but the birds were neither seen nor heard.

Mr. G. T. Porritt reports that the only Neuroptera noticed of any interest were *Chrysopa tenella*, rather commonly, and *Micromus paganus*. The small Trichopteron *Agapetus fuscipes* was abundant among the aquatic vegetation growing in the stream running through Skelbrook Park.

In the evening, after tea at the Glyn Hotel, Doncaster, a meeting was held under the presidency of Mr. Porritt, at which thanks were accorded to Dr. Corbett, of Doncaster, who had carried out the arrangements, and to the landowners, for permission to visit the estates.

COLEOPTERA.—The entomologists present were Messrs. G. T. Porritt, H. H. Corbett, and E. G. Bayford, the last two also representing the Yorkshire Coleoptera Committee. The prevailing wind during the earlier part of the day proved a great drawback to collecting, few insects being on the wing, the results being of a somewhat unsatisfactory character. One of the notable sights of the day was the trunk of a large Ash tree, honeycombed with the burrows of larvæ of *Sinodendron cylindricum*, of which several hundreds must have been present. The following is a list of the Coleoptera observed :—

Nebria brevicollis F.
Harpalus puncticollis Payk.
,, *ruficornis* F.
,, *æneus* F.
Calathus cisteloides Panz.
Anchomenus angusticollis F.
,, *albipes* F.
Bembidium lampros Herbst.
Haliplus ruficollis De G.
Agabus didymus Ol.
Platambus maculatus L.
Helophorus sp.
Cercyon unipunctatus L.
,, *terminatus* Marsh.
Tachyporus hypnorum F.
Stilicus rufipes Germ.
Oxytelus rugosus F.
Anthobium ophthalmicum Payk.
,, *torquatum* Marsh.
Catops sericeus Panz.
Coccinella 7-punctata L.
**Nitidula rufipes* L.
Meligethes viridescens F.
Enicmus minutus L.
Sinodendron cylindricum L.
Athous hæmorrhoidalis F.
Helodes minuta L.
Microcara livida P.
Cyphon coarctatus Payk.
Strangalia armata Herbst.
Grammoptera ruficornis F.
Chrysomela polita L.
Hydrothassa marginella L.
Prasocuris junci Brahm.
Crepidodera ferruginea Scop.
Apion trifolii L.
Phyllobius oblongus L.
,, *pyri* L.
Hylesinus fraxini Panz.

* New to the Riding, having been recorded from the East Riding only.

Mr. M. H. Stiles sends the following list of Diatoms found on the Excursion.

No. 1—Skellow Pool, Dam and Brook.
,, 2—Brook at Hampole.
,, 3—Brook in Skelbrooke Park.
,, 4—Adwick Dam.

The Nomenclature adopted is that of Van Heurck,

Amphora ovalis Kutz. 1, 3, 4.
Cymbella cistula Hempr var. *maculata* 3.
Cymbella cymbiformis Ehr. 1, 3, 4.
Cymbella cymbiformis var. *parva* 1.
Cymbella lanceolata Ehr. 1.
Cymbella gastroides Kutz. 1.
Cymbella cuspidata Kutz. 1.
Encyonema prostratum Ralfs. 1.
Encyonema ventricosum Kutz. 1, 2,,4
Stauroneis Smithii Grun. 3, 4.
Stauroneis Phœnicenteron Ehr. 3.
Navicula major Kutz. 3.
Navicula viridis Kutz. 3.
Navicula viridis var. *commutata* 3.
Navicula oblonga Kutz. 3.
Navicula gracilis Kntz. 1, 3.
Navicula amphisbæna Bory. 1, 3, 4.
Navicula cuspidata Kutz. 3. 4.
Navicula limosa Kutz. 1, 3.
Navicula limosa var. *gibberula* 3.
Navicula viridula Kutz. 3.
Navicula viridula, forma *minor* 1.
Navicula viridula var. *Slesvicensis* 3, 4.
Navicula peregrina Kutz. var. *Menisculus* 1.
Navicula radiosa Kutz. 1, 2, 3, 4.
Navicula radiosa var. *acuta* 1.
Navicula elliptica 1.
Navicula Iridis Ehr. var. *amphirhynchus* 1, 3.
Navicula Iridis var. *dubia.* 3.
Navicula Brebissonii Kutz. var. *subproducta* 3.
Navicula Gastrum (Ehr.) Donk var. *placentula.*
Navicula Reinhardtii Grun 1, 3.
Navicula cryptocephala Kutz. 2.
Navicula sphærophora Kutz. 1.
Pleurosigma attenuatum Wm. Sm. 1, 3, 4.
Pleurosigma Spencerii Wm. Sm. 1, 3.
Cymatopleura solea (Breb.) Wm. 3 Sm. 1, 3, 4.
Cymatopleura elliptica (Breb.) Wm. Sm. 1, 3. 4.
Gomphonema constrictum Ehr.
Gomphonema acuminatum Ehr. 1, 3.
Gomphonema montanum Schumann var. *commutatum* 1, 3.
Vanheurckia vulgaris(Thw.)H. V. H. 1, 2, 4.
Rhoicosphenia curvata (Kutz.) Grun 1, 2, 4.
Achnanthes lanceolata Breb. 1, 3.
Cocconeis Pediculus Ehr. 1, 2, 4.
Cocconeis Placentula Ehr.var. *lineata* 1, 3, 4.
Epithemia gibberula Kutz. var. *pro ducta* 3.
Eunotia gracilis (Ehr.) Rab 1, 3.
Eunotia arcus Ehr. 1, 3.
Eunotia arcus var. *bidens* 3.
Eunotia pectinalis (Kutz.) Rab *forma curta* 1, 3.
Synedra pulchella Kutz. 1, 2, 3, 4.
Synedra pulchella var. *Smithii*
Synedra pulchella forma *major* 1.
Synedra Ulna (Nitzsch) Ehr. 2, 3.
Synedca Ulna var. *oxyrhynchus* 3
Synedra Ulna var. *longissima* 1, 3.
Synedra Ulna var. *lanceolata* 1, 2.
Synedra Ulna var. *splendens* 1, 2.
Synedra Ulna var. *obtusa* 1.
Synedra Acus (Kutz.) Grun 1, 3.
Synedra capitata Ehr. 1, 3.
Synedra Vaucheriæ Kutz. var. *parvula* 3.
Fragilaria capucina Desmaziuret 1, 4
Fragilaria capucina var. *inflata* 1.

Fragilaria mutabilis (Wm. Sm.) Grun 1, 3.
Fragilaria tenuicollis Heib var. *intermedia* 3.
Denticula tenuis Kutz. 1.
Diatoma vulgare Bory 1, 3, 4.
Diatoma elongatum Ag. 1, 2, 3.
Meridion circulare Ag. 1.
Surirella biseriata Breb. 4.
Surirella elegans Ehr. 4.
Surirella ovalis Breb. var. *minuta* 4.
Surirella ovalis var. *ovata* 2.
Campylodiscus Hibernicus Ehr. 3.
Nitzschia Tryblionella Hantzsch 4.
Nitzschia Tryblionella var. *Levidensis* 4.
Nitzschia dubia Wm. Sm. 4.
Nitzschia apiculata (Greg) Grun 4.
Nitzschia sigmoidea (Ehr.)] Wm. Sm. 1, 3, 4.
Nitzschia amphibia Grun 1.
Nitzschia thermalis (Kutz) Grun 1.
Nitzschia vitrea Norman var. *recta* 1.
Melosira varians Ag. 1, 2, 3, 4.
Melosira arenaria Moore 1, 3.

H. E. W.

REPTILIAN FOOTPRINTS IN THE LOWER OOLITES AT SALTWICK.

Professor PERCY F. KENDALL, M.Sc., F.G.S.

THE interesting note in the 'Naturalist' on Mr. Brodrick's find of Reptilian Footprints at Saltwick mentioned the fact that the exact horizon at which they occurred had not been ascertained. The excursion of the Yorkshire Geological Society to the coast on the 25th to 28th September, afforded an opportunity for investigating the matter. Many footprints were observed in association with ripple-marks, sun-cracks and rain-pittings in a pale sandstone readily identifiable as part of a recent fall from a bed of 'freestone,' at a rough estimate, about 70 or 80 feet above the Dogger. If the estimate is correct, the bed is some distance below the Eller Beck Bed, and, therefore, in the lower part of the Lower Estuarine Beds. It may be worth mentioning that some of the slabs yielded plants referable to Thuytes, and a single specimen of Unio was also found.

FIELD NOTES.

GEOLOGY.

Coast Erosion at Dimlington.—On a visit of the Hull Geological Society to the coast on July 18th, it was noticed that the remains of the wall on Dimlington high-land were just twelve yards distant. In 1905 the wall was seventeen yards distant, and in 1833 it was 147 yards away. As the cliffs are considerably over 100 feet in height at this point, it will be seen that the amount of land washed away is enormous.—T. SHEPPARD, Hull.

ARACHNIDA.

Pseudo-scorpion new to the East Riding.—On July 28th I found six pseudo-scorpions under chalk boulders on the embankment facing the Humber at Saltend Common, about four miles east of Hull. These include five examples of *Chthonius tetrachelatus* Preys., new to the East Riding List, and one *Chthonius rayi* L. Koch. For identification I am indebted to Mr. H. Wallis Kew, F.Z.S.—T. STAINFORTH, Hull.

***Erigone spinosa* Camb. near Hull.**—Amongst a number of spiders collected on Saltend Common, near Hull, on July 28th, were two males of *Erigone spinosa* Camb. which Mr. W. Falconer has identified. The first British examples of this species were obtained in the same locality in May, and are described and illustrated by the Rev. O. Pickard Cambridge, M.A., F.R.S., etc., on p. 378. All the specimens were obtained among the salt-marsh plants on the banks of Hedon Creek, on a portion covered only at extremely high tides.—T. STAINFORTH Hull.

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MAMMALS.

Albino Bat in Lincolnshire.—I was much interested the other evening in watching a white bat flying for some time in front of the windows here. It seemed to be larger than the ordinary bat, though this may be only apparent. It came quite close to the window, being apparently attracted by the insects on the Jasmine, and I watched it for quite half an hour—(Mrs.) K. FIELDING, Carrington Vicarage, Boston, August 20th, 1908.

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FUNGI.

***Naucoria nucea*=*Agaricus nuceus* Bolton at Clapham.** A box of Fungi sent to me on September 7th from Clapham, by Mr. R. Fowler Jones, contained a most interesting agaric rarely met with. It was first discovered near Halifax by J. Bolton in 1787, and was figured and described in his 'Hist. Fungusses Growing about Halifax' Tab. 70. The only other places where it has been recorded are Scotland, Sweden, and Russia. There is no mistaking it for any other species with the figure and description as guide. It is included in Massee's 'Fung. Flo. II.,' p. 158, accompanied by Bolton's original description in full. The spores are pale yellow, base slightly apiculate, and measure $10 \times 6\,\mu$. One feels a pleasure in being able to confirm old records ; when the species is of rare occurrence, they are quite as valuable as new discoveries.

Mr. Malone, of Bradford, was also very active in searching out fungi at Clapham, he himself collecting no fewer than between seventy and eighty species, including an exceedingly fine example of *Gomphidius viscidus* ; also *Collybia plexipes ; Hypomyces torminosus,* and the reddish variety of *Hydnum repandum*—var. *rufescens.*—C. Crossland, Halifax, September 15th, 1908.

New Yorkshire Agarics.—A collection of Fungi gathered in Firby Wood, Kirkham Abbey, by the York and District Field Naturalists' Society, was sent to me September 14th, by Mr. R. Fowler Jones. Among them were two species new to the county—*Psilocybe agraria* and *Russula serotina.* The latter is worthy of notice as being one of the least of the British Russulæ.—C. Crossland, Halifax.

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COLEOPTERA.

***Corymbites castaneus* L. and *Scymnus nigrinus* Kug. in Yorkshire.**—I am pleased to be able to record the recent occurrence of *Corymbites castaneus* L. in Yorkshire. I found a single specimen of this very rare beetle on a sallow bush by the side of the moorland stream above Ravensgill, Pateley Bridge, on June 8th.

On the occasion of the meeting of the Yorkshire Naturalists' Union, on August 1st, I took the local *Scymnus nigrinus* Kug., not far from Osmotherley. This species is found on the lower branches of pines, and, like the preceding insect, does not appear to have been previously met with in Yorkshire.

I am indebted to Mr. E. A. Newbery, of London, for kindly identifying these additions to our county fauna.—M. Lawson, Thompson, Saltburn-by-the-Sea, September 1908.

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MOLLUSCA.

***Helix aspersa* var. *exalbida*—a correction.**—In the report on the natural history of Hornsea, which appeared in the 'Naturalist' for August (p. 307), the specimen of *Helix aspersa* var. *exalbida* should have been recorded as from a wall near the mere. The specimen was given to me by Mr. J. W. Boult, who has found this variety in the same locality for several years.—F. H. Woods, Bainton Rectory.

REVIEWS AND BOOK NOTICES.

Part VIII. of **Cassell's Nature Book** includes articles on 'Waves and their work,' by F. M. Duncan; 'The Plane tree,' by H. Irving; 'The Hedgehog,' by Douglas English; 'Common British Fungi,' by M. U. Clarke; and 'Life History of a Mountain,' by J. Lomas. Each article is profusely illustrated by charming photographs.

By the Roman Wall, by **Maria A. Hoyer.** London: David Nutt, 159 pp., 2/6 net.

The authoress, together with a friend (a lady friend!), spent her holiday along the Roman Wall, and, with the aid of Bruce's book, and an imaginative mind, carefully examined what exists to-day, and formed an idea of how things used to be. Her impressions are placed on record in this book. To those interested in by-gone times, the volume will prove of interest. The authoress soars above the earth at times, but is reminded of mundane things when called to meals, etc. On one occasion 'the sun, hidden behind a mass of cloud, shaped like the outspread wings of some enormous bird, poured down rays of silvery light and misty softness over the western hills, and the wind blew hard as if it designed to sweep us bodily away. *All this the Roman soldiers saw* as they kept watch and ward on their wall.' The authoress seems to have been very careful in her descriptions, and her volume will be handy to those who cannot readily get access to Bruce's book. She is evidently an enthusiastic student, a careful reader of Tennyson, and likes a good cup of tea!

Heredity, by **J. A. Thomson.** London: J. Murray, 1908. 605 pp., 9/- net.

In this handsome volume Prof. Thomson gives a review of the various doctrines of heredity. Though essentially a scientific treatise, and one thoroughly up-to-date as regards the present theories of heredity, the volume is written in a fascinating style, which can be read and understood by the veriest layman. The work is divided into fourteen chapters, viz., Heredity and Inheritance, defined and illustrated; The Physical Basis of Inheritance; Heredity and Variation; Common modes of Inheritance; Reversion and Allied Phenomena; Telegory and other Disputed Questions; The Transmission of Acquired Characters; Heredity and Disease; Statistical Study of Inheritance; Experimental Study of Inheritance; History of Theories of Heredity and Inheritance; Heredity and Development; Heredity and Sex; and Social Aspects of Biological Results. These headings will give a good idea of the comprehensiveness of Prof. Thomson's work. The various chapters are well illustrated by figures in the text, and by plates; the coloured illustrations being all that can be desired. It must be said that Prof. Thomson deals fairly and justly with the various theories he discusses, though he admittedly adheres to what is called Weismannism—he is of the opinion that no instance is known of the transmission of acquired characters. Great attention is paid throughout the volume to the three conclusions which have been arrived at by microscopic study of germ cells, by the application of statistical methods, and by experiment. A very important and valuable part of the book is the bibliography, which is arranged (*a*) in alphabetical order according to the authors' names, and (*b*) a subject index, in which the various papers and monographs under definite heads (abnormalities acquired characters, ancestral heredity, law of, etc.), are given. To the student, these are most useful. An idea of the thoroughness of the bibliography may be gathered from the fact that it occupies fifty-seven closely-printed pages. There is also a good index. 'Heredity' forms one of Mr. Murray's Progressive Science Series. We should like to sincerely congratulate both author and publisher on this work. It will do much to clear away many of the misunderstandings on this important subject. The publishers enable us to give our readers some sample illustrations (plate xliii).

We have received part I. of **Wild Beasts of the World,** published by Messrs. T. C. and E. C. Jack, and to be completed in seventeen shilling parts. The text is written by Frank Finn, and the coloured illustrations are by Louis Sargent, C. E. Swan, and Winifred Austen. The part before us deals with the Chimpanzee, Gorilla, Orang Utan, Hoolock Gibbon, Lungoor Monkey and Guereza Monkey. The text is carefully written, and the coloured illustrations are all that can be desired. When completed, the work will be a marvel of cheapness. We can thoroughly recommend it.

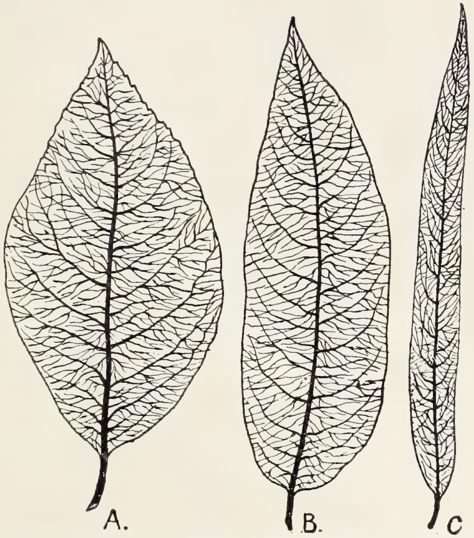
Garden Rockery: How to Make, Plant, and Manage it, by **Francis George Heath.** London : George Routledge. 173 pp., price 1/-

By the aid of forty-five illustrations, Mr. Heath admirably shews what to do, and (what is of more importance) what not to do, in order to have a successful rock garden. He deals with the best soil to use ; the rocks and their arrangement ; large and small rockeries, etc., etc. The volume is thoroughly practical, and is evidently the result of a wide experience. To all who are interested in gardening, and especially 'wild' gardening, the book will appeal. It has a good index, and is well printed, and well bound. We cannot understand how the publishers are able to produce it at so low a figure as one shilling.

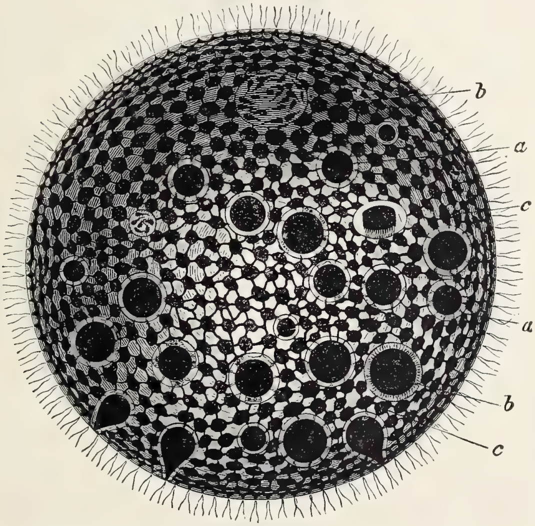
African Nature Notes and Reminiscences, by **F. C. Selous.** 348 pp.

President Rooseveldt, who is so well qualified to judge of matters pertaining to wild sport and natural history field work, has done good service in urging the issue of the present volume to which he contributes an introduction. In it, Mr. Selous not only tells us more of his fascinating hunting experiences, but also gives admirable studies of the habits and natures of the principal feral animals of South Africa. Which of these is most combative and dangerous, has long been a moot point. Our author places them in the following order : lion, elephant, buffalo, rhinoceros, bringing forward many proofs that the dispositions of the two last are much less rampant than is commonly reputed, and his conclusion being founded upon exceptionally long and intimate acquaintance with all of them, will naturally carry much weight. Doubtless, however, the members of a species occupying even a limited area show great variation of temperament, individually, and in widely separated or climatically differing regions, probably collectively, which may account for the divergent views of big-game hunters as to their respective aggressiveness. The book contains an interesting chapter on the Tse-tse fly, and much instructive material relating to the vexed questions of Protective Colouration and Influence of Environment. In connection with the former, it may be noted that Mr. Thayer's recent experiments with regard to 'Obliterative Colouration,' seem to show that strong distinctive patches of colour on an animal tend by breaking up its outline to make it inconspicuous rather than the reverse. The book has good illustrations by Mr. Caldwell, and also some remarkable photographs of the progress of a struggle between a full-grown rhinoceros, and its unseen and victorious crocodile antagonist, or antagonists. In short, from beginning to end it is full of interest and information, and from a natural history point of view is perhaps the most important of Mr. Selous' works.

Vol. XIX. of the **Transactions of the Dumfries and Galloway Natural History and Antiquarian Society** for 1906-7, is recently to hand. It is a substantial volume of over 200 pages, and contains abstracts of the various papers read before the society, some of which are illustrated. There are articles on all manner of subjects, from the Presidential Address of Professor Scott-Elliot, on 'The Migrations of Man,' to 'Scottish Mermaids,' by Mr. R. J. Arnott. Mr. R. Service deals with Bird Migration at Southerness, and in Dumfriesshire ; and there are papers on the local castles, climate, trees, reptilia, ancient sanitation, as well as several historical items. The society does not limit itself to its own area, and we find a paper on Yorkshire Abbeys.



Leaves of Willow : A, of one parent ; C, of the other parent ; B, of the hybrid intermediate between them. (After Wiesner).



Volvox globator, an Infusorian forming a colony of cells, showing the ordinary cells (*c*) that make up the colony or incipient 'body'; *a* and *b*, the special reproductive cells, both male and female—the beginning of the distinction between germ-cells and somatic cells.

BRITISH MUS
NATURAL

We have received No. 15 of the **Journal and Transactions of the Leeds Astronomical Society** for the year 1907. Leeds, R. Jackson & Son, 1908. 81 pp., price 2/-. This volume bears strong evidence of the vitality of the Society, and of the variety of subjects discussed by its members, all having a strong bearing on the Society's work. Amongst the many items are ' Astronomy without Instruments,' by J. A. Hardcastle ; ' Recent Observations ' and ' Astronomy in Tennyson,' by the editor, C. T. Whitmell ; ' Astronomical Research in 1906,' by the President, Aquila Dodgson (a portrait of whom appears as frontispiece to the publication) ; ' The Transit Instrument,' by E. K. Spiegelhalter, and ' Has Science Killed Romance,' by Miss Tranmar. The last is an exceedingly clever and entertaining paper, on quite original lines. Her conclusion is that' Romance is not murdered, but married by Science.' There are also several pages devoted to the work of the society. Far from being a ' dry ' production, this Journal of Transactions is exceedingly entertaining.

The Origin of a Land Flora : A Theory based upon the facts of alternation, by **F. O. Bower, Sc.D., F.R.S.** MacMillan & Co. 727 pp., price 18/- net.

In a substantial volume of over seven hundred closely-printed pages, Prof. Bower presents one of the most scholarly contributions to botanical science that we have seen for some time. It is divided into three parts :— (1) ' Statement of the Working Hypothesis ; (2) Detailed Statement of Facts ; and (3) Conclusion. The first section contains twenty chapters and an Introduction ; the second, a similar number, and the third, seven chapters. There are also over 360 figures, either from careful drawings, or from actual photographs of microscopic sections, etc.

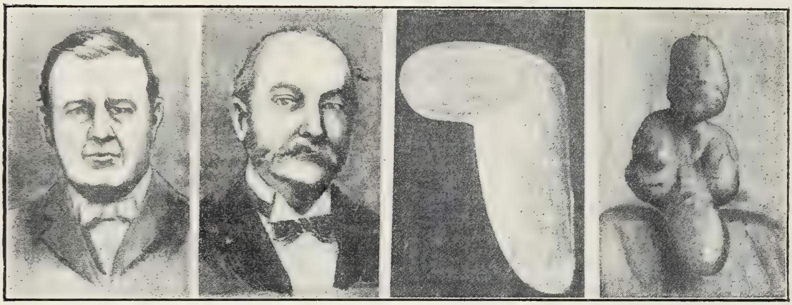
A fresh enquiry into the nature and origin of Alternation in Archegoniate plants was stimulated as a result of the discovery by Farlow of apogamy in ferns, in 1874 ; and of the demonstration, a decade later, by Druery, of instances of apospory in ferns. Prof. Bower followed with his own observations, and to him it seemed probable that some biological cause had determined the prevalence and constancy of the alternation, to which apogamy and apospory appeared as occasional exceptions. The theory was entertained that the change of conditions involved in the invasion of the land by organisms originally aquatic had played a prominent part in the establishment of those alternating phrases of the life-cycle, which are so characteristic of Archegoniate plants. So long ago as 1889 Prof. Bower had written several chapters of a treatise on this subject ; but the necessary facts were then found to be so imperfectly known that the full discussion of the matter was deferred, and the work abandoned. Instead, the Biological Theory of Antithetic Alternation was briefly stated in a paper in the ' Annals of Botany ' (1890). The main position of Celakovsky, in discriminating between Homologous and Antithetic Alternation was adopted, but the latter type, as seen in Archegoniate plants, was recognised as having been fixed and perpetuated in accordance with the adaptation of aquatic organisms to a Land-Habit. Between 1894-1903 the ' Studies in the Morphology of Spore-producing Members ' appeared as preliminary investigations. In 1894 Strasburger contributed his well-known paper on the ' Periodic Reduction of Chromosomes,' in which he brought forward facts to establish the cytological distinction of the alternating generations, his theoretical position being practically identical with that of Prof. Bower's paper of some years earlier. Now, after seventeen years, Prof. Bower has been able to state the biological argument much more fully, strengthened by many new facts. These the student will find in the present volume, a work which at once takes its place with those of Hofmeister, Sachs and Strasburger. At last English botanists can feel that they have a work in their own language, produced by one of themselves, which will hold its own against the scholarly works which previously seemed to be entirely ' made in Germany ! ' The publishers, Messrs. MacMillan, cannot be thanked too much for their share in bringing ' The Origin of a Land Flora ' before English students.

BRITISH ASSOCIATION NEWS.

Whilst some officials of the British Association were being photographed at Dublin, they were informed by the operator that if they faced to the right, and turned their eyes to the left, it would give them quite an intelligent appearance!

The students at Trinity College, in common with most other people at Dublin, took exception to the large hoarding in front of their building, which had the words 'British Association' upon it. In the night the letters 'ociation' were removed, the remainder being left for the benefit of the visitors.

The Irish Press certainly rose to the occasion in connection with the meeting of the Association. In 'The Irish Independent' for the opening day was the line of blocks here reproduced on a smaller scale, evidently issued for the benefit of the visitors. The first photograph is supposed to represent 'Sir E. Ray Lankester, one of the most prolific of scientific authors'; the second is 'Lord Rayleigh, Chancellor of Cambridge, and Scientific Advisor to Trinity House, author of numerous scientific papers.' The third is a 'Curious-shaped egg laid by a Tipperary hen'; and the fourth is labelled 'Freak Potato, resembling human figure, recently dug by Mr. Francis Camp, County Kerry.' Above the blocks were the words 'Pictures of Freaks,' but in fairness to 'The Irish Independent' and the two 'Scientific Authors,' we ought to state that the heading apparently referred only to the last two blocks!



The Rev. George Furlong read a paper on 'Unique Experiences at the Birth of a Volcano' to section E.

The mention of the word 'Silurian' in a paper on the underground rocks of Kent, gave a Canadian visitor an opportunity of occupying the time of section C to a considerable length, whilst he spoke of the charms and attractions of Canada.

The 'Daily Mail' reports that 'when Mr. Francis Darwin stood up to deliver his address, every seat was taken!' To this 'Punch adds: '*Study for the Descent of Man*; Mr. Darwin trying to sit down again.' In the same journal, bearing on the Presidential Address, is an article on 'Cruelty to Vegetables: Remarkable meeting of Protest.' In this, the evidences which Mr. Darwin 'had been able to furnish, which pointed to the existence of consciousness in plants—their intelligent habits, irritability, powers of sleep, and so on—has suddenly awakened the national conscience to the horrible iniquities of vegetarians, and above all, fruitarians,' who indulged in 'the barbarous habit of eating the raw flesh of live fruit.'

The members of section C were photographed at Dublin. One of the party, evidently a victim to the prevailing humorous epidemic, secured a large label—' Geological Specimens '—from an adjoining door, and held it above the members' heads, and it was duly 'taken.' Such a geological collection is not often seen together at one time !

From the ' Dublin Mail ' we learn that Mr. H. Wager told the botanists attending the British Association of a remarkable discovery, whereby photographic lenses may be made from leaves of plants. The outer layers of many kinds of leaves, he said, are so constructed that the rays of light are brought to focus in the interior of the leaf. The cells, in fact, behave as convex lenses. The extraordinary part of the paper was the statement that the author had actually taken photographs through these living lenses. Some remarkably clear photographs were shewn upon the screen, taken through the lenses of leaves—photographs of Huxley and Darwin, of the author's niece, of landscapes, and so on.

After the above we were quite prepared to see the following in one of the dailies :—' A scientist has been saying that plants can see. Well, beanstalk ' !

From the ' Irish Times ' we learn that ' the long-expected meeting came upon us suddenly at the last, and we were hardly prepared for the vigour of its arrival. But the pimply outbreak of our streets into notice-boards bearing arrows and figures in inextricable confusion, and the poster-strewn aspect of our ancient University, which caused it to be besieged by bewildered foreigners under the idea that it was announcing the closing performances of the " Merry Widow," roused us to a sense of our responsibilities.'

In section ' C ' Tuesday morning was occupied by a discussion on ' Mountain Building,' in which Prof. Joly, Prof. Lapworth, Prof. Sollas, Prof. Cole and Sir Archibald Geikie took part. This alone was worth a visit to Dublin.

In his presidential address, Mr. Francis Darwin pointed out that there had not been a Botanical President of the British Association since the Norwich Meeting forty years ago, when Sir Joseph Hooker was in the chair, and in ' eloquent and felicitous words ' (to quote his father's letter) spoke in defence of the doctrine of evolution. He was sure that every member of this Association would be glad to be reminded that Sir Joseph Hooker was, happily, still working at the subject that his lifelong labours have so greatly advanced, and of which he has long been recognised as the honoured chief and leader.

A total of £1191 was granted for scientific purposes at the Dublin meeting. This amount, however, included various unexpended balances from the previous year. Amongst the items granted for 1910 we notice :—Seismological Observations, £60 ; Fossiliferous Drift Deposits, £11 ; Fauna and Flora of British Trias, £8 ; Crystalline Rocks of Anglesey, £1 ; Faunal Succession in the Carboniferous Limestone in British Isles, £10 ; Erratic Blocks, £12 ; Palæozoic Rocks, £15 ; Composition of Charnwood Rocks, £2 ; Igneous and Associated Sedimentary Rocks of Glensaul, £20 ; Investigations at Briska, £50 ; Index Animalium, £75 ; Table at the Zoological Station at Naples, £100 ; Hereditary Experiments, £40 ; Feeding Habits of British Birds, £5 ; Glastonbury Lake Village, £5 ; Excavations on Roman Sites in Britain, £5 ; Age of Stone Circles, £30 ; Anthropological Notes and Queries, £40 ; Researches in Crete, £70 ; Structure of Fossil Plants, £5 ; Botanical Photographs, £10 ; Symbiosis between Turbellarian Worms and Algæ, £10 ; Survey of Clare Island, £65.

Mr. H. Brodrick read a paper to Section C, on the footprints from the Yorkshire Oolites, which were illustrated in these columns recently. He stated that he had since found a further slab upon which there were impressions of several footprints.

At a meeting of the general Committee, a resolution was passed requesting that the abstracts of each section should be bound up and offered for sale within two months of the meeting. As these are in type before the meeting starts, the difficulty does not seem to be great, and we hope it will be carried out. As these abstracts and addresses constitute a fair proportion of the volume, we took the liberty of suggesting that it would be a great boon if the volume itself were to appear within two months, instead of the eve of the following meeting. We learned, however, that the staff had to take its holiday, and there was also a difficulty in getting proofs back from the authors. There may be something in this, but the fact remains that by far the greater part of the annual Report is *in type,* and corrected, for the meeting itself.

The Committee for the Investigation of the Fossiliferous Drift Deposits at Kirmington, Lincolnshire, and at various localities in the East Riding of Yorkshire, reported that it was the intention of the Committee to have completed the work at Bielsbeck during the present summer, but owing to the field being under corn-crop, further excavation was impracticable till after the harvest. The work will be carried on immediately after the harvest, and it is hoped that the final report of the Committee will be in readiness before the next meeting. The Committee was re-appointed with power to expend the balance of the grant.

Mr. Francis Darwin's remarkable address to the British Association was prefaced by the words ' You will perhaps expect me to give a retrospect of the progress of evolution during the fifty years that have elapsed since July 1st, 1858, when the doctrine of the origin of species by means of natural selection was made known to the world in the words of Mr. Darwin and Mr. Wallace. This would be a gigantic task, for which I am quite unfitted. It seems to me, moreover, that the first duty of your President is to speak on matters to which his own researches have contributed. My work—such as it is—deals with the movements of plants, and it is with this subject that I shall begin. I want to give you a general idea of how the changes going on in the environment act as stimuli, and compel plants to execute certain movements. Then I shall show that what is true of those temporary changes of shape we describe as movements, is also true of the permanent alterations known as morphological.

' I shall insist that, if the study of movement includes the problem of stimulus and reaction, morphological change must be investigated from the same point of view. In fact, that these two departments of inquiry must be classed together, and this, as we shall see, has some important results—namely, that the dim beginnings of habit or unconscious memory that we find in the movements of plants and animals must find a place in morphology ; and inasmuch as a striking instance of correlated morphological changes is to be found in the development of the adult from the ovum, I shall take this ontogenetic series and attempt to shew you that here also something equivalent to memory or habit reigns.

' Many attempts have been made to connect in this way the phenomena of memory and inheritance, and I shall ask you to listen to one more such attempt, even though I am forced to appear as a champion of what some of you consider a lost cause—the doctrine of the inheritance of acquired characters.'

The subjects discussed by the Conference of Delegates from the Corresponding Societies of the British Association were :—' Detailed Natural History Surveys of Restricted Areas,' an important work suitable for Local Societies, introduced by Professor G. H. Carpenter, Dublin ; 'Sanctuaries for our Native Fauna and Flora,' by Mrs. Mary Hobson, Belfast; ' The Advisableness of Re-Stocking Haunts whence Fauna and Flora have disappeared,' by H. Davey, Esq., Brighton ; and ' Permanent Records of Natural History or other Observations by means of the Card Catalogue System,' by F. A. Bellamy, Esq., Oxford.

The Handbook to the City of Dublin and the surrounding district, issued under the editorship of Prof. Cole and Mr. R. Lloyd Praeger, is an exceedingly useful and carefully-prepared volume, and may be taken as an ideal type of handbook for these meetings. Its contents are varied, but are just what one wants on visiting a district for a few days. We are glad to notice that the volume is printed and bound in uniformity with the York and Leicester volumes. We trust that this plan will continue. In past years the British Association handbooks have varied considerably, from the small, square-backed limp Liverpool volume, to the three large, stiff, yellow-backed Glasgow guides.

As might be expected, the geologists had a thoroughly up-to-date address from Prof. J. Joly, who took for his subject: 'Uranium and Geology,' We regret we should be unable to do justice to this excellent address if we endeavoured to summarise it, and must refer our readers to the address itself.

In his address to the Anthropological Section at Dublin, Prof. W. Ridgeway made a strong appeal for the application of Zoological Laws to Man. He pointed out that 'Amongst wild animals, Nature selects the fittest for continuing the race, and the wise breeder simply aids Nature by selecting still more carefully the best animals. The legislator, on his part, ought similarly to foster the increase of the best element in the State, and, on the other hand, discourage the multiplication of the worst. Yet in our community, statesmen of both parties have adopted the very opposite policy. The children of the working classes are educated at the cost of the State, the offspring of the wastrels are given free meals, and already there are demands that they shall be clothed at the expense of the ratepayers, and that the parents shall even be paid for providing them with lodging. It is not impossible that before long these demands will be conceded by either party in the State. The heavy additional expense incurred in this policy falls upon the middle-class ratepayers and taxpayers, who have to feed, educate, and clothe their own children by sending them to the State schools; but this is to level down instead of to level up; for if they do so, they will be lowering the general morale of their own class, the most priceless asset of the nation. The heavy burden of taxation entailed by this policy, falling as it does with special weight on the middle classes, renders it more difficult each year for the young men and the young women in that class to marry before thirty, for they naturally shrink from the expense of bringing up large or even moderate-sized families. We need not then wonder at the falling-off in the rate of increase of the middle classes. Our legislators are bad stockmasters, for they are selecting to continue the race the most unfit physically and morally, whilst they discourage more and more the increase of what we have proved to be the outcome of a long process of natural selection. The present policy, therefore, tends to reduce that which in all ages has been the mainstay of every State—the middle class. . . If the present policy of our legislators is adherred to, the moral and the physical standard of the British citizen will steadily deteriorate, for the population will gradually come to consist of the posterity of those who are themselves sprung from many generations of the most unfit. Should this unfortunately come to pass, it will be the result of human pride refusing to apply to the human race the laws which inexorably regulate all Nature.'

A particularly noticable feature at the Dublin meeting was the business-like way in which the various sections carried out their work. We rarely remember an occasion upon which the devotion to scientific work was so whole-hearted; the passage across the Irish Sea had kept several of the drones away, and those who braved it were disappointed by the weather, which made garden parties more like water carnivals. Singularly enough, Sunday was far the best day as regards the weather, and was an agreeable break in the week's work.

An interesting feature at Dublin was the exhibition of local geological, botanical and natural history specimens, and local photographs of scientific interest, arranged by the Dublin Naturalists' Field Club.

Space does not permit us to enumerate all the titles of papers read at the British Association. The following, however, additional to those referred to elsewhere, are likely to be of interest to our readers :—Dr. H. A. Bemrose.—Notes on the Microstructure of Derbyshire Limestone ; H. Brodrick,—Notes on the formation of Cave Pearls ; Professor Boyd Dawkins, F.R.S.—The derivation of Sand and Clay from Granite ; Dr. Tempest Anderson.—Changes in Soufriére of St. Vincent ; Professor W. W. Watts, F.R.S.—Report on Geological Photographs Committee ; Dr. Dwerryhouse.—Reports on Erratic Blocks ; Dr. Woolacott.—On a case of thrust and crush brecciation in the Magnesian Limestone, Co. Durham ; J. W. Stather.—Report on Kirmington Deposits ; J. Lomas.—Report of Trias Committee ; Dr. A. Vaughan.—Report on Carboniferous Succession ; Dr. F. A. Dixey.—Diaposematism, or the interchange of Characters between distasteful forms ; Professor E. B. Poulton, F.R.S.—(i.) Mimicry in the Butterflies of North America. (ii.) Recent investigations upon the African Swallow-tail Butterfly *Papilio dardanus* (*merope*) as an example of mimicry ; Dr. Gordon Hewitt.—A proposed enquiry into the feeding habits of British Birds ; Discussion on 'The abuses resulting from the strict application of the rule of priority in zoological nomenclature, and on the means of protecting well-established names,' opened by Mr. G. A. Boulenger, F.R.S. ; Professor Cossar Ewart, F.R.S.—Wild ancestors of the domestic horse ; Dr. A. Smith Woodward, F.R.S.—The Evolution of fishes ; Dr. R. Newstead.—Bionomics of Tsetse Flies ; Dr. R. Newstead.—Recent Investigations at Roman Chester ; Dr. R. F. Scharff.—Some Remarks on the Irish Horse and its early history in Ireland ; J. Gray.—Who built the British Stone Circles ? ; G. Clinch.—On the Classification of the Megalithic and analogous Pre-historic Remains of Great Britain and Ireland ; Report of the Committee for the Collection, Registration and systematic Preservation of Photographs of Anthropological Interest ; Rev. Dr. H. J. Dukinfield Astley.—Cup and Ring-Markings ; W. J. Knowles.—Perforated Stone Hammers and Axes ; Dr. C. E. Moss.—The Woodlands of Northern England ; W. C. Worsdell.—The Origin of Dicotyledons ; Mrs. D. H. Scott.—On *Bensonites fusiformis*, and on the Sporangia of the associated fossil, *Stauropteris burntislandica.*

Mr. H. G. Fordham favours us with a copy of his 'Notes on the Cartography of the Counties of England and Wales,' read to the Geographical Section. He points out that in all, about 400 maps have been published of the county of Hereford, and that any complete collection of the whole series of engraved maps of a county in England or Wales, 1579-1900 would contain approximately the same number. A useful bibliography accompanies the paper.

In an address on 'Education in relation to Rural Life,' Dr. L. C. Miall stated that 'At present what may be called labour-saving contrivances are far too popular in the classes where biology and nature-study are taught. Of these labour-saving contrivances pictures and lantern-slides, ready-made preparations (dead, of course), printed descriptions, museum lectures, etc., are much recommended and employed. It may safely be said that the knowledge which will help to develop industries is not to be got by such facile methods. There are already a few teachers scattered over the British Islands who are taking a more promising course, and striving to lead their pupils to see, to handle, and to think for themselves. Our hopes for the future rest upon the gradual increase of teachers of this type.'

The attendance at the Dublin meeting was 2297, which shews very favourably against the Leicester meeting (1647) and York (1972). This should be some indication of the advantages of the earlier date adopted this year.

In 1909 the Association visits Winnipeg. Invitations from Sheffield for 1910, and from Portsmouth for 1911 have been accepted. Through some misunderstanding, the invitation from Hull was not dealt with, though the President announced that such had been received. It is hoped that Hull may see the Association in 1912.

Prof. H. A. Miers, the Chairman of the Conference of Delegates, delivered an address on 'The Educational Opportunities of Local Scientific Societies.' In this he made special reference to Mr. G. W. Lamplugh's presidential address to the Yorkshire Naturalists' Union, entitled 'On the Necessity for the Amateur Spirit in Scientific Work,' which appeared in this journal for March, 1906.

A pleasing feature was the breakfast at the Zoological Gardens, by the invitation of the Royal Zoological Society of Ireland. There was a very large attendance, and the remainder of the morning was spent in examining the very excellent series of live animals, which are there so successfully reared. The various generations of lions, born in the gardens, were particularly fine.

A Conversazione given by the Royal Dublin Society enabled the members to see the excellent collections in Leinster House. The collections of Irish antiquities—particularly the gold ornaments, were examined again and again by many of the members. It is said that there are more prehistoric ornaments of gold in the Dublin museum than in all the other museums of Europe put together.

In various Sections resolutions were unanimously passed opposing the present method of zoologists in adhering strictly to priority in zoological nomenclature, resulting in the frequent changing of well-established names. This was the result of the absurd extremes which had been reached, as pointed out in these columns recently.

NORTHERN NEWS.

A description of the new buildings of the University of Leeds appears in 'Nature' for July 16th.

Late in September Holderness was infested with a plague of 'Daddy Longlegs,' the local papers recording 'millions upon millions' up and down the district.

The 'Annotationes Zoologicæ Japonenses' (Vol. IV., part 4) recently to hand, contains a number of important contributions to zoology. They are by Japanese naturalists, are printed in English, and published by the Tokyo Zoological Society.

According to an article published in the 'Zoologischer Anzeiger' by Mr. K. Toldt, there is good evidence to shew that the fox is descended from ancestors the bodies of which appear to have been clothed with horny scales like those of the pangolins.

A well-known figure in the botanical world has passed away by the death at Richmond of Mr. Geo. Nicholson, A.L.S., member of the Horticultural Society, one of the original holders of the Victorian medal for horticulture, and ex-curator of Kew Gardens. He was born at Ripon in 1847. His most important work was 'The Dictionary of Gardening,' published in 1888.

It is announced that Canon Greenwell, F.R.S., Durham, the well-known antiquary, has sold his collection of ancient bronze implements, etc.—perhaps the largest and most valuable private collection in the world—the purchaser being a gentleman who will present the collection to the British Museum. It will be a source of gratification that so excellent and valuable a collection is likely to be retained in the country, and placed at the services of the nation.

An article on ‘ Baldness in Birds ’ in a birdy magazine, is illustrated by a photograph of the editor ; but he's got a cap on.

Mr. W. P. Pycraft, of the British Museum, ought to be a proud man. The editor of a certain weekly is ‘ quite prepared ’ to accept his evidence.

Honour for a Yorkshire ornithologist. A photograph of ‘ A climber in mid-air,’ by a well-known Yorkshire ornithologist, appears in the ‘ Country-side ’ for August 29th.

An authority is ‘ inclined to think that when men lived as hunters in caves and huts, the robin used to be encouraged as a killer of insect vermin.’ This, of course, accounts for the robin's familiarity to-day.

According to the ‘ Liverpool Echo,’ some prehistoric human skeletons have recently been found, the femur bones of which ‘ exceeded in length by several inches the same bones in the *arms* of the biggest workman.’

‘ How to distinguish birds at sight. The blackbird can be distinguished from the fieldfare by its uniform black colour,’ so we read. We can quite believe it. For the same reason we could distinguish a crow from a snowy owl, if we were properly trained.

The best ‘ fly ’ for bass, according to the editor of ‘ The Fishing Gazette,’ is ‘ a silvery little bit of soleskin made like a white-bait.’ In order to catch the sole, ‘ Punch ’ has found that ‘ the best worm for this is the wing-liver of a sea-anemone made like a minnow ! ’

The Report of the Marine Biological Station of the West of Scotland for 1907 shews that the Committee has had a very anxious year's work. Matters now seem on a much better footing, and we trust that the usefulness of the Station at Millport will increase as years go on.

A writer on ‘ Life on the Sea-shore ’ in Cassell's ‘ Nature Book,’ figures and frequently refers to various species of ‘ Pectans.’ In case the author should further contribute to a natural history publication, he might at least ascertain the correct spelling of some of the commonest objects he describes. He also recommends the old method of ‘ putting salt on its tail ’ for catching a razor-shell.

According to the local press, the Duke and Duchess of Connaught recently went cliff pigeon shooting at Speeton. This, the editor of a certain weekly, will not believe ; and we can scarcely credit it. But, this same editor feels quite sure that cliff pigeon is a misprint for ‘ clay pigeon,’ the latter being a small disc, like a little gramophone record, which is mechanically thrown out in a swerving flight . . . There is no close time for ‘ clay pigeons.’ Nor for editors ! We can just imagine Ned Hodgson and his ‘ gallant men ’ throwing clay pigeons up and down Speeton Cliffs, to be ‘ potted ’ by Royalty.

We have received the following from Mr. Otto Hermann, Director of the Hungarian Central Bureau for Ornithology.—‘ The winter-quarters and routes of our migrant birds are until now yet unknown, and there is only one method which leads to positive knowledge on this account : the marking of birds by aluminium rings, a method which has been tried with success in Germany and in Denmark, as a house-stork marked in Pomerania, was caught in Africa, 15° S. of the Equator. The Hungarian Central Bureau for Ornithology has now also begun the marking of young storks, herons, gulls, and swallows. The aluminium ring is fastened around the leg of the bird, and it bears in each case the inscription ‘ BUDAPEST,’ followed by a number which corresponds to the entry in the Register-book of the Hungarian Central Bureau for Ornithology. Anyone catching such a marked bird, or hearing of the capture of such, is kindly requested to send the ring on to the Hungarian Central Bureau for Ornithology, Jozsef-körút 65, Budapest VIII., Hungary, accompanied by a notice stating the locality, time, and particulars of capture.’

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GEO. H. CARPENTER, B.Sc., R. LLOYD PRAEGER, B.A., AND
ROBERT PATTERSON, F.Z.S., M.R.I.A.

This MAGAZINE should be in the hands of all NATURALISTS interested in the distribution of animals and plants over the British Islands.

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A Quarterly Magazine.

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THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY
T. SHEPPARD, F.G.S., F.S.A.Scot.,
The Museum, Hull;
AND
T. W. WOODHEAD, Ph.D, .F.L.S.,
Technical College, Huddersfield.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
J. GILBERT BAKER, F.R.S. F.L.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S.,
T. H. NELSON, M.B.O.U.,
GEO. T. PORRITT, F.L.S., F.E.S.,
JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.

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Yorkshire Naturalists' Union.

SECTION FOR VERTEBRATE ZOOLOGY.

(President—Riley Fortune, Esq., F.Z.S.).

Two Meetings of the above section will be held in room No. C 9 at the Leeds Institute, Leeds, at 3 p.m., and at 6-30 p.m. respectively, on Saturday, November 21st, 1908.

BUSINESS :—

To consider the Sectional Report for 1908, and to recommend the names of officers for the section for 1909.

To consider the Report of the Wild Birds' and Eggs' Protection Acts Committee for 1908, and to recommend the names of officers and committee for 1909.

To supply opportunity for the discussion of subjects retative to the work of this section, and for the purpose of exhibiting specimens, photographs, lantern-slides, etc., connected with Vertebrate Zoology.

A series of short papers will be read, amongst others, by Mr. W. Denison Roebuck, F.L.S., on 'Suggestions for the Investigation of Yorkshire Mammals, Reptiles, and Fishes'; by Mr. Riley Fortune, F.Z.S., on 'The Sandwich Tern in the North of England'; by Mr. E. W. Wade, M.B.O.U., on 'The Present Status of the Stone Curlew in Yorkshire'; by Mr. W. H. Parkin, on 'The Development of the Young Nightjar, with Special Reference to the Growth of the Pectinated Claw'; by Mr. A. Haigh-Lumby, on 'The Cuckoo and its Mysteries' (from the recent German of Dr. Th. Zell); by Mr. Sydney H. Smith, on 'Snap-shots of a Naturalist Sportsman'; by Mr. N. N. Lee, on 'The Migrations of the Salmonidæ'; by Mr. H. B. Booth, M.B.O.U., on 'The Changing Distribution of the Long-tailed Titmouse in the West Riding.

If time permits, Mr. Rosse Butterfield will introduce a discussion on 'How many Passerine Birds are Double-brooded in Yorkshire'?

All members and associates of the Yorkshire Naturalists' Union interested in Vertebrate Zoology are invited to attend, and to bring any notes, specimens, photographs, lantern-slides, etc.; and are requested to bring forward any matters of interest connected with the work of the Section.

Any member or associate is at liberty to introduce a friend.

Please Note.—As it is desired to make these meetings as representative as possible of the Yorkshire Naturalists' Union and of the County of Yorkshire—it is particularly requested that officials of all the Affiliated Societies will draw the attention of their members to this notice.

N.B.—Meetings will probably be held in the same rooms, and at the same hours, on Saturday, February 13th, 1909. On this date Mr. E. S. Stewart, F.R.C.S., M.B.O.U., has promised to give a resumé of his recent ornithological trip to Spain—illustrated by specimens and by lantern slides.

Any further particulars can be obtained from the Honorary Secretary of the Yorkshire Naturalists' Union, at the Museum, Hull; from Mr. H. B. Booth, 'Ryhill,' Ben Rhydding; or from any of the officials of the Vertebrate Section.

NOTES AND COMMENTS.

VOLCANOES.

Few who attended the meetings of Section C. of the British Association, Dublin, will readily forget the extremely lucid and valuable account of the changes that have recently taken place in the Soufriére in St. Vincent, given by Dr. Tempest Anderson, of York. By the aid of several remarkable photographs, Dr. Anderson was able to indicate the extraordinary amount of denudation that had taken place there during the past five years. The magnitude of this appeared to be almost equalled by the way in which the vegetation had gained a footing on the new plateaux of volcanic material. An admirably illustrated report on the subject has been printed by the Royal Society, in its Philosophical Transactions,* and with it is published 'Petrographical Notes,' by Dr. J. S. Flett.

VESUVIUS AND GUATEMALA.

Equally interesting and instructive are two further reports recently issued by Dr. Anderson. The first deals with the Volcanoes of Guatemala, and is published by the Royal Geographical Society; and the second gives an account of 'The Eruption of Vesuvius,' and is printed in the volume issued by the International Geological Congress (Mexico). The value of these reports is very great, whether viewed from the point of view of geography, geology, or botany; and we sincerely hope that Dr. Anderson may long be spared to carry on his valuable researches.

MALACOLOGY *versus* PALÆOCONCHOLOGY.

With the above title, Mr. B. B. Woodward recently gave a presidential address to the Malacological Society.† In this he referred to the state of affairs which he regretted to say existed between the students of the recent and fossil forms of Mollusca. 'Each goes too much his own way without taking account of the work of his fellow, and at the same time complaining, and often with justice, that the other pays no heed to his discoveries or conclusions. Surely it is not asking too much of the morphologist that, though apparently endowed with a plethora of recent material to work on, he should, nevertheless, check the results of his investigations as to the phylogenetic relationships of the groups with which he may be dealing by the corresponding work of his palæontological brethren so far as they will serve him.'

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* Series A, Vol. 208, 1909. pp. 273-332.

† Proc. Malac. Soc., Vol. VIII., Pt. 2, 1908.

METHODS, RIGHT AND WRONG.

'On the other hand, no condemnation is too strong for the palæontologist who wilfully ignores the teaching of the morphologist, and persists in classing together convergence forms, well known at the present day (*e.g.*, *Dreissensia* and *Septifer*), that have no natural relationship. Such only do harm to the science by retarding its progress, and it must be regretfully added that in this they are only too frequently assisted by some students of recent forms, who occupy themselves exclusively in compiling faunal lists on antiquated lines.'

AN ALBINO SLUG.

The October Journal of Conchology is an exceptionally interesting number, largely devoted to Lancashire, the papers having reference to that county being a lengthy list of 'The Land and Fresh-water Mollusca of Grange-over-Sands,' by Harry Beeston; '*Vertigo alpestris* in N. Lancs. and Westmorland,' by J. D. Dean and C. E. Y. Kendall; '*Vertigo antivertigo* in the Silverdale district,' 'Bibliography of the Non-Marine Mollusca of Lancashire,' and 'Report of the Grange Ramble,' by J. W. Jackson. Mr. Beeston's paper is illustrated by a block from an excellent photograph of *Arion ater* var. *alba* L., which we are kindly permitted to reproduce.

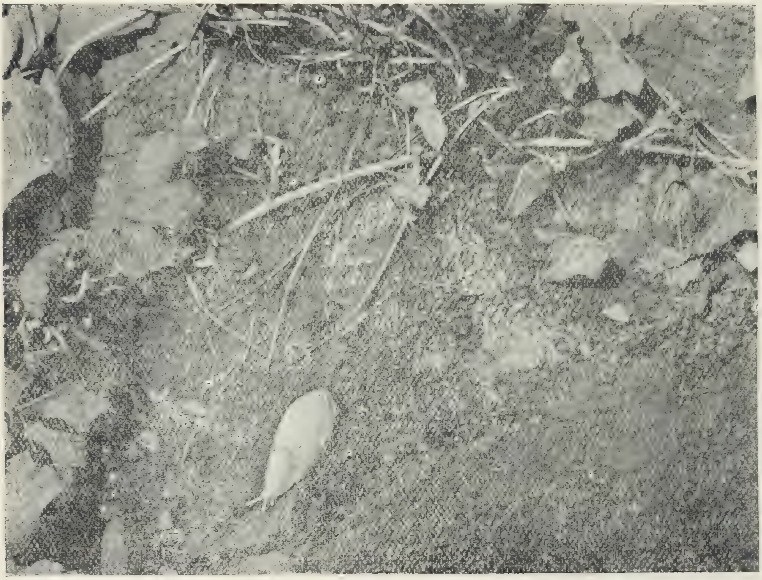

Photo by] ***Arion ater* var. *alba*.** [*G. A. Booth.*

THE BIRDS OF NORTH-WEST LINDSEY.

MAX PEACOCK,
Cadney, Brigg, Lincs.

(*Continued from page 277*).

SNOWY OWL.—Has certainly visited Bottesford once. It was called 'that great white owl,' in the winter of 1868-69. Its cry was awful to listen to in the winter night, and it was said that it could be heard calling a mile off on still evenings. There was only one bird—not a pair, and it was only saved because my father would not let it be shot.

LITTLE OWL.—I have no record of this species yet for my district. It is in the South Lincolnshire Woods, and has reached Tumby in North Lincolnshire. It can only be a question of time before it occupies the Eastern Woods, if it is permitted to do so by the gamekeepers.

There are many notes for the Falconidæ I cannot add here, because so few observers can identify them certainly.

MARSH-HARRIER.—This is a very rare species now. It was not uncommon early last century. 'It nested in the Isle of Axholme in 1836,' says Stonehouse, in the 'History of the Isle,' p. 62.

HEN-HARRIER.—Occurs more frequently on migration than the last species, but it is rare. There was an old male at Epworth during 1868-69. A pair got three young ones off in the gorse on Raventhorpe Common as late as 1872.

MONTAGU'S HARRIER.—This is the Egg-Hawk of the old commoners, I believe, though this name was more rarely applied to the Marsh-Harrier. It was not uncommon on the carrs before the enclosures and warping. Old Mrs. Abey, of Cadney, born in the opening years of last century, talked of four birds of prey :—'The Egg Hawk, Ringtail, Kite, and Blue Hawk.' In this short list, the second and third names refer to the Hen-Harrier, I believe. I have only one record. A female bird with her eggs taken on one of the commons round Brumby many years ago, was sold at the late Mr. W. Moss's sale at that hamlet. What became of it I cannot say. In the case with this bird was a party-colour white and red leveret about a quarter grown.

Buzzard.—Is not rare, though not so uncommon as the last three species. It visits Lincolnshire every season on migration, and would soon breed again if allowed. I shot a male, 4th January 1891, in the Home Close, at Bottesford. I saw pairs in the Eastern Woodlands in 1893, and again in 1900. Mr. F. M. Burton says, 'Seldom seen about Gainsborough.'

Rough-legged Buzzard.—Not quite so common as the last on migration, but it reaches us at times. Mr. J. G. Nicholson shot one near the fox-covert at Willoughton about 1887—a bird in breeding plumage. He gave me the skin, which was never set up. I sent it to the late John Cordeaux in 1888. I have heard of other birds, but all were immature specimens.

Golden Eagle.—Is a rare, storm-driven visitor. Coulthurst, the late Sir Robert Sheffield's keeper, shot the last I have heard of in Normanby Park, 1st of November 1881. The skin is at West Halton, Doncaster. It was a young male bird, and had been seen at Crosby the week before.

White-tailed Eagle.—Has drifted into this district down the Humber. Mrs. H. Abey, of Cadney, told the Vicar that one frequented the Ancholme Carrs, then unenclosed, about 1819. This perhaps is the same specimen the late Sir Charles Anderson recorded in his 'Short Guide to Lincolnshire,' Gainsborough, 1847.

Goshawk.—Is another species which rarely visits us. A pair of truly wild birds tried to nest in a larch plantation at Normanby in 1864. The female bird was most foolishly shot, and the male bird left the neighbourhood. I shot one at Bottesford which had, no doubt, escaped from a falconer, for it had a ring round its left leg, 1878.

Sparrow Hawk.—Is fairly common, and nests every year, if it be not troubled, in its old home places.

Kite.—Is now very rare, and has given up attempting to nest with us. Sixty years ago it was fairly common all over. In 1875 I saw one sailing over the Manor garden at Bottesford. There is a specimen at Brigg which was killed by the late David Hopkins in Howsham Barf Wood.

Greenland Falcon.—There is a specimen in the Strickland collection, which was trapped at Twigmoor in 1826. Stonehouse names it as having been obtained in the Isle of Axholme

Gyr-Falcon.—Sir Charles Anderson records one shot at Scunthorpe in 1823.

Peregrine.—Is the commonest of the Falcons, and rare when that is said ; yet it visits this county every season. One was trapped at Epworth, 19th March 1868. Mr. Brewster records one for South Kelsey, 17th December 1874. A pair visited the Eastern Woods during the winter 1886-87, and received the usual reception, being shot or frightened away. Again for some weeks from December 1897 to March 1898 this bird or birds visited the Carrs of Cadney and South Kelsey, killing plover and wood-pigeon. Neither the Vicar nor I were lucky enough to view them, though we frequently observed their work. I heard later that a pair would have nested in Mr. Sutton Nelthorpe's woods at Scawby, but the keeper would not permit this, though the birds were not shot. Early in 1904 the work of another bird or birds was observed in Cadney Carrs, wild duck even falling victims. On the 27th of April 1904, my nephew Dennis viewed a single Peregrine as it made a fine stoop at a leveret. The leveret rushed into some very long grass by the hedge, and the Peregrine missed it.

Hobby.—Still rarely attempts to breed with us in the Eastern and other woods. I shot a female in Cole's Plantation, Ashby, 2nd June 1881. Mr. Burton says, 'One or two shot by keepers about Gainsborough.'

Merlin.—Was not very rare as long as our moorlands existed. There were nests on Manton Warren in 1862 and 1875. It has tried to nest since I have been told. Two adults were taken at Epworth in the winter 1868-69. It used to be found on Brumby West Common, but has been driven away by enclosure. Mr. Burton says, 'One was killed by dashing against a window at a canary hanging in a cage within, at Mr. Forrest's house, Gainsborough.'

Kestrel.—Is found all over the district. It would be nesting in every wood if it were left in peace.

Osprey.—I have never seen this species alive. Sir Charles Anderson records one shot at Norton Place before 1847. Cordeaux records two for the Epworth-Trent part of my district. I am told it has been seen on the Trent since. The Vicar saw the skin of a female which contained eggs, shot at Twigmoor, 10th of May 1900, by Thomas Pike. A 'Fish Hawk' also visited the Twigmoor ponds about a month in 1872. It was not shot.

Cormorant.—Reaches our sheltered waters on the Trent or inland only during storms.

Shag.—This is only a storm-driven species too.

Gannet.—Is driven into the Humber and Trent, too, by heavy storms, more frequently than the last two species.

Heron.—May still be seen about our becks, or flying over during the whole year. There has always been a heronry in the Eastern Woods. Formerly it was in the Broughton lordship, but some years ago, when there was a large fall of timber at Mamby, the birds moved their nesting place to Appleby, the next parish. The woodland is continuous, with only a high road to mark the parish boundary. The Vicar has counted herons by scores on the warpings in the Isle of Axholme in the last ten years.

Bittern.—Was frequent, and nested with us before the Carrs and Marshes were reclaimed or warped. It is a rare visitor now. I have four notes since 1850. One on Brumby West Common, shot by the late W. Cole Wells Clark; two others from the same Common, shot by the late George and his father, Tom Tacey; and in 1886 Mr. G. Roadey shot one on Scotton Common. If they were only left in peace, they might still nest there again, I believe, as a pair visited Shorndyke in 1899, and the 'booming of the butterbump' attracted attention to them. One was shot, and nailed upon a tree alongside other poor bipeds, whose only fault is their shy habits. Our more ignorant peasants still blame this species for deadly deeds against game and fish. 'One was killed at Usselby, 11th of January 1896,' Mr. Young says. 'Two have been shot near Gainsborough in recent years,' is Mr. Burton's note. I have every reason to believe they still visit this county annually, some years in fair numbers.

Stork.—Is named by Stonehouse as an Isle of Axholme bird formerly. There is some trifling proof that it was once not uncommon in the Great Fenland. He could hardly apply this name to the Spoonbill, for he was an intimate friend of my grandfather, and a fair naturalist. The Spoonbill, too, was certainly not rare in Lincolnshire one hundred and fifty years ago. He names the Heron and Crane in the same sentence, so these birds are excluded. A nice question arises: if the Stork formerly frequented the Isle district, did the bird follow the Dutchmen who drained the whole of the Isle, or the men follow the bird they love?

ON THE FRINGE OF THE CLEVELAND HILLS.

During August Bank Holiday week-end a very representative party of Yorkshire naturalists investigated the western fringe of the Cleveland Hills, in the vicinity of Osmotherley. On account of the number present, the headquarters were fixed at Northallerton, where at the ' Golden Lion ' the landlady did her best to cater for the varied interests of a somewhat unusual party. Waggonettes were requisitioned to convey the members to and from the field of operations ; the weather was perfect, and cider was plentiful, and fairly good. The rambles through the woods with Messrs. Ingham, Hartshorn, Fortune and Booth, across the moors with Dr. Smith and Messrs. Gibbs and Snelgrove, along the escarpment with Mr. Elgee, and round Mount Grace Priory under the guidance of Messrs. H. E. Wroot and W. N. Cheesman, were experiences which will long be remembered by those who were fortunate enough to be present. The excursion was a revelation to those unaccustomed to naturalists and their ways. The geologists, perhaps, fared the worst, if such a word can be used when all went so well ; but they were handicapped by the absence of their appointed leader, Mr. J. J. Burton ; by the few exposures

Photo] [*R. Fortune, F.Z.S.*

The Chequers Inn.

met with during the week-end, and, perhaps, by an attack of acute carelessness on the part of some of those present.

Three full days' work were included in the programme, the party on the Monday being only added to but slightly, on account of the difficulty of reaching this out-of-the-way place and getting away from it again in a single day.

On Saturday Thimbleby was visited, and the journey followed through Oakdale, and over 'Black Hambleton,' which those who ascended it will be surprised to learn is not more than 1249 feet in height. A call was made at the Chequers Inn, in order to see the peat fire, which is said to have been kept burning during the last two hundred years. It was found to be alight, but burning in an early Victorian grate!

Photo] [*R. Fortune, F.Z.S.*

'Poachers.'

The following day was devoted to an examination of the remains of the Carthusian Priory at Mount Grace, and the woods adjoining. Within the walls of this interesting building most of those present turned antiquary, and probably spent a much more pleasant and profitable day than did any of the Carthusian monks, each of whom was cribbed, cabined, and confined within his little world of a few yards square. Around the walls were the usual medicinal and poisonous plants, so characteristic of these old religious houses, the party being particularly pleased at a very large and luxuriant clump of Danewort.

On Monday Scarth Nick and Scugdale were the scene of operations, the glacial features of the area, as elucidated by Professor Kendall, being very striking; well-known friends in the form of boulders of Shap Granite were fairly common, and of more than passing interest were the game-keepers' hoards, where extraordinary numbers of cats'-tails gave evidence of a keen eye having been kept on 'poachers.' At Osmotherley the members had an opportunity of seeing how a certain section of the inhabitants of Middlesborough spent a 'pleasant' Bank Holiday. On Saturday evening Mr. F. Elgee read a very suggestive paper on 'The Problems of the Fauna of North East Yorkshire,' which gave rise to a good discussion.

The following reports of the work accomplished are since to hand :—

VERTEBRATE ZOOLOGY.—Messrs. R. Fortune and H. B. Booth write :—The season of the year, combined with the distance from Northallerton to the area under investigation, was not conducive to working out the vertebrate fauna very thoroughly. But during the three days the number of species identified under this section resulted in the fairly respectable total of sixty-seven.

Seven mammals were noted, viz. :—Stoat, Weasel, Common Shrew (several found killed on the roads), Rat, Water Vole (only seen at the pond near to Mount Grace Priory), Rabbit (common), and Hare. The last named would almost appear to be rare in this neighbourhood, as only one individual was noted during the three days' excursion, but no doubt the abundant cover in the growing corn would give them every security from observation. Mice were abundant in the ruins of Mount Grace Priory, but the species was not identified. The members were pleased to hear that Badgers were not uncommon along the escarpment near Thimbleby, and to learn that they are now protected by Mr. J. S. Barwick*.

Bird-life was very quiet, and for the most part birds sought seclusion with their young families in the thickets and dense foliage. Fifty-seven species were recorded. Amongst others, the following were noted :—Stonechat (in Scarth Nick), Jay, Greater Spotted and Green Woodpeckers, Sparrow Hawk, Kestrel, Merlin, Stockdove (only one seen), and Little Grebe (on a pond near to Mount Grace Priory). Blackbirds and Yellow-hammers deserve special notice, because they were so particularly abundant. The song of the Yellow-hammer was persistent on every side, and was the only bird-song heard during the three scorching days.

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* As a proof of sincerity, a Badger-trap was consigned to an old curiosity shop in Hull.—H. B. B. [This is a 'joke.'—ED.].

The country contained very few water-courses or ponds, which no doubt limited the number of species of birds, but not of individuals. Such common species as the Sand Martin, Swift, Sedge Warbler, Pied Wagtail, Waterhen and most of the Warblers (with the exception of the Whitethroat) were very local, and not at all common ; whilst the Corn Bunting, Redstart, Whinchat, Grey and Yellow Wagtails were not observed at all. Tree Creepers were fairly abundant in the woods. Lapwings had gathered into small flocks—one of the first signs of the waning of summer. The Common Lizard was seen on ' Black Hambleton.'

The Frog and the Toad were the only amphibians noted. Mr. W. Denison Roebuck drew attention to the remarkable variation in the colour of these creatures (more particularly in the Toads), in the grounds of Mount Grace Priory. That this could not be entirely due to environment was demonstrated by three Toads of very varying colouration being noted under the same stone.* It is desirable that some local member should make further investigations.

The trout was the only fish seen.

Three game-keepers' ' museums ' were examined and inventories taken. No 1 contained the remains of 56 Stoats and Weasels, 10 Jackdaws, 3 Crows, and 26 Cats' tails ! No. 2 consisted of 18 Stoats, 8 Weasels, 5 Magpies, 8 Jays, 1 Crow, 1 Rook, 2 Sparrow-hawks, and 2 Cats' tails. No. 3 (in the neighbourhood of Nether Silton) contained a single Tawny Owl and 3 Cats' tails. We were pleased to hear that generally, no species of Owl was persecuted in the district. It is particularly interesting to note that both Hawks and Owls are absent from No. 1, and especially were we pleased to hear that the owner discouraged the destruction of these birds, in addition to protecting the Badger.

---

* A toad that I took home was of a uniform ferruginous or russet hue. This I kept for 17 days, and for the most part in a dark place, after which time it escaped. Its colour did not change, excepting that perhaps it became an almost imperceptible shade darker.—H. B. B.

COLEOPTERA.—Mr. M. L. Thompson writes that the following beetles were met with on the route from the plantations along the face of the escarpment near Thimbleby Lodge, across the moors to Nether Sutton on Saturday :—

Nebria gyllenhallii Sch.
Bradycellus cognatus Gyll.
Pterostichus vitreus Dej.
Calathus flavipes Fourc.
Calathus melanocephalus L.
Olisthopus rotundatus Payk.
Trechus minutus F.
Trechus secalis Payk.
Oxytelus rugosus F.
Anthophagus testaceus Gr.
Adalia obliterata L.
Brachypterus urticæ F.
Cercus rufilabris Lat.
Epuræa æstiva L.
Meligethes æneus F.
Micrambe vini Panz.
Cyphon coarctatus Payk.
Malthodes marginatus Lat.
Crepidodera transversa Marsh.
Anaspis maculata Fourc.
Apion humile Germ.
Strophosomus coryli F.
Phyllobius argentatus L.
Ceuthorrhynchus ericæ Gyll.

MOSSES AND HEPATICS.—Mr. W. Ingham, B.A. writes :—The negative results of this excursion with these plants are of equal interest with the positive results. A marked feature of the district traversed is the absence of mosses from the stone walls and tree trunks, forming such a contrast with the Bowes District in a former excursion.

It is strange, too, that such widely distributed and common mosses as *Camptothecium sericeum*, *Brachythecium rutabulum* and *Hypnum cupressiforme* were not found by any of the party, although one tuft of the *C. sericeum* was growing on the upper part of a wall forming part of the ruins of Mount Grace Priory.

Arncliffe Wood was densely packed with a vigorous growth of the flowering plants, but by the side of a wide ditch the moss *Tetraphis pellucida* and the Hepatic, *Lophocolea heterophylla* were growing associated.

It will be seen that the most interesting plants found were the *Sphagna* or *Bog Mosses*, which grow in a considerable number of varieties and species.

Saturday, 1st August.—On the track from Thimbleby Lodge through the wood to the ascent of Black Hambleton was growing a large patch of a vivid green moss called *Pleuridium axillare*, crowded with fruit.

The Hepatic, *Scapania undulata* was growing at a small spring.

The top of Black Hambleton was very dry, and unsuited to the growth of mosses, the only moss seen here being the ubiquitous *Webera nutans*, in a scorched condition. The descent of this hill to Nether Silton yielded the following plants: *Sphagnum Girgensohnii*, in a large deep mass under heather; *S. acutifolium* var. *viride*; the beautiful variegated *S. subnitens* var. *versicolor*; and *S. molluscum*, forma *compacta*.

Mixed with the bog-mosses were the true mosses *Plagiothecium undulatum* and *Hypnum Schreberi*. *Philonotis fontana* was abundant by a spring in the descent.

Monday, 3rd August.—The long drive of this day prevented a search for mosses, and interest did not begin with these plants until Scarth Nick was reached. On the Nick is a small bog, chiefly occupied by a fine form of the bog moss *Sphagnum recurvum*, and with it was associated **S. cuspidatum*.

The interesting plants here, however, are found by the sides of a small stream. This little stream is bordered on both sides by varied bog mosses, and it is interesting to notice how, by the side of a stream, these mosses grow in large, rounded, compact masses, embedded almost up to their *capitula*, in wet sand deposited by the stream.

The most striking moss here was **S. papillosum* var. *normale*, forma *conferta*. The other bog mosses embedded in sand are **S. cymbifolium* var. *pallescens*; *S. subnitens* var. *virescens* in fruit, and var. *pallescens*. By the stream was also a tall growth of the true moss, *Dicranella squarrosa*, but the most interesting species was growing with the *S. recurvum* in the small bog. It is *Hypnum exannulatum* var. *pinnatum* forma *acuta*, known by its short wide leaves with short points. This is evidently a mountain form of *H. exannulatum*. I found the same plant on the Rawthey shoulder of Baugh Fell, and it also grows on Widdale Fell. These are the only Yorkshire records known to me.

Mr. Snelgrove brought some mosses from the moors near Holy Well Gill. Among them is a very fine large growth of *Hypnum Schreberi*, very different in habit from the type of this moss as we know it in the lowlands almost everywhere where heather grows. The other plants he gathered are the Hepatics, *Pellia epiphylla*, *Diplophyllum albicans*, and *Cephalozia bicuspidata*; the beautiful and delicate Bog-moss **S. rubellum* var. *rubrum*; very tall *Webera nutans* (a typical heather moss); also very tall *Polytrichum commune* in fruit; *Dicranella heteromalla* and a little *D. cerviculata*; *Catharinea undulata*; *Philonotis fontana*; *Hypnum commutatum* and *H. falcatum*.

The last three mosses indicate that Mr. Snelgrove had found a much-desired wet district. The above may be considered satisfactory in the absence of rocks, cliffs, and especially dripping cliffs.

The four plants above marked * had previously been recorded in 'Baker's North Yorkshire.'

MYCOLOGY.—Mr. T. Gibbs writes:—The two mycologists, Mr. W. N. Cheesman, F.L.S., and the writer spent most of their time in the lower and moister portions of the fine woods which cover the slopes of this portion of the Cleveland Hills, these being the only places which were likely to prove at all productive after the spell of fine, dry weather, which we had lately passed through. A diligent search of tree trunks, stumps, and dead branches and twigs, of which there were plenty; and of decaying herbaceous stems in the swampy places, atoned for the deficiency of large Agarics in the pastures and woodlands, by revealing many interesting minute species which might have been overlooked in presence of an abundant crop of the larger species. On the Saturday afternoon, a strip of woodland in the lower portion of the Codbeck, near to Kirby Sigston was investigated. The species found there are given as 'Codbeck' in the list below. Members of other sections, as usual, contributed by bringing in such specimens as they noticed, these including an interesting Puffball from the high moor not yet determined.

In the list which follows one species, *Nolanea minuta* Karst, does not appear to have been previously recorded as British, this is distinguished by an *. Five species (marked †) are new to Yorkshire, and three others (marked ‡) new to vice-county N.E. Yorkshire.

Lycoperdon Bovista. In pasture.

Ithyphallus impudicus. Among undergrowth in a wood.

Amanita rubescens. In a wood.

Armillaria mellea. Mycelium on dead trunks.

Collybia platyphylla. Among Bracken, etc. in a wood.

Mycena galericulata.

,, *alkalina.* On deed wood.

Mycena metata. On the ground in wood.

Mycena hæmatopoda. On dead wood

Mycena sanguinolenta. Among dead leaves.

Omphalia umbellifera. The yellow form on the high moor.

Omphalia grisea. On dead twig, Codbeck.

Omphalia fibula. Among moss.

Pleurotus ostreatus. On path near Mount Grace Priory, growing from buried wood.

Pleurotus acerinus. On living holly, Clack Lane End.

Pleurotus applicatus. On dead wood.

† *Volvaria media.* On gravel path, Mount Grace Priory.

Pluteus cervinus. On dead wood, Codbeck.

Entoloma sericellum.

* *Nolanea minuta.* On bank of peaty ditch in Arncliffe Wood.

Pholiota mutabilis. At base of living Ash, Codbeck.

Inocybe rimosa. On roadside, among grass.

Inocybe scaber. On bank of peaty ditch, Codbeck.

Naucoria effugiens (= *Crepidotus rubi* B, & Br.). One specimen of this beautiful but minute species was found growing on a dead branch in Arncliffe Wood.

Galera spartea. On the ground in woods.

Crepidotus mollis. On dead trunks, Codbeck.

Agaricus campestris. A fine group was found growing under scattered trees.

Hypholoma fasciculare. On stumps

,, *lacrymabundum.*

Anellaria separata. On dung.

Psathyrella atomata. On the ground in wood.

Psathyrella disseminata. Abundant on dead trunks, Codbeck, growing from a rich brown 'ozonium.'

Coprinus atramentarius. On stumps and on the ground.

Coprinus micaceus. On dead trunks.

Lactarius subdulcis. Mount Grace.

Russula vesca. On the ground in wood.

Cantharellus aurantiacus. On the high moor.

Boletus flavus.

Polyporus squamosus. On living and dead trunks and stumps.

Polyporus hispidus. On living Ash trunks.

Poria vaporaria. On dead branches.

Polystictus versicolor. On dead stumps.

Daedalea quercina. On oak stumps.

Grandinia granulosa.
Odontia fimbriata.
Both on dead branches.

Stereum hirsutum.
,, *sanguinolentum.*
Corticium arachnoideum.
Hymenochæte rubiginosa.
Peniophora ochracea.
,, *cinerea.*
† ,, *hydnoides.*
All these on dead branches and trunks.

Calocera cornea. On dead trunk.

Puccinia poarum. Aecidia on 'Coltsfoot.'

Puccinia suaveolens. On Cnicus arvensis.

Hypocrea rufa. Both the perfect and conidial stages on dead wood.

†*Hypocrea strobilina.* On decaying fir wood.

Dialonectria sanguinea. On dead bark.

Hypoxylon rubiginosum. On dead branch.

Hypoxylon atro-purpureum. On insect-growth on dead fir branch.

Phyllachora junci. On decaying rushes.

Rhytisma acerinum. On living leaves of Sycamore.

Eutypa lata. On dead trunks.

Lasiosphæria ovina.
Psilosphæria spermoides. Both on dead trunks.

Raphidospora acuminata.

Heptameria doliolum.

Heptameria acuta.
These three on dead herbaceous stems.

Sphærella rumicis. On leaves of Dock.

Erysiphe cichoracearum. On leaves of Heracleum, etc.

Humaria granulata. On cow dung.

Lachnea setosa. On dead wood.

,, *hemispherica.* On the ground under nettles in wood.

Sphærospora asperior. On bare ground on drive in wood.

Dasyscypha virginea. On twigs, herbaceous stems, etc.

Dasyscypha nivea. On trunks and stumps.

Dasyscypha hyalina. On decorticated wood.

‡ *Dasyscypha spiræicola.* On dead Meadow-sweet, Mount Grace.

Chlorosplenium æruginosum. Mycelium in dead branch of oak.

‡ *Helotium Hedgwigii.*
,, *cyathoideum.*
Both on dead herbaceous stems.

Belonidium Clarkei. On dead wood.

,, *pruinosum.* On old dry 'Eutypa lata.'

Mollisia cinerea. On dead wood.

,, *atrocinerea.* On dead stems of Angelica, thistles, etc.

‡ *Mollisia dilutella.* On dead stems of Epilobium hirsutum.

Ascobolus furfuraceus. On cow dung.

Ombrophila clavus. On dead twigs in ditch.

Orbilia leucostigma and *var. xanthostigma.*
Both on dead wood.

Pilobolus crystallinus. On cow dung.

Monilia aurea. On rotten wood.

† *Menispora ciliata.* On dead decorticated wood.

Torula herbarum.
Cladosporium herbarum.
Both on dead herbaceous stems.

† *Cladotrichum Cookei.* On dead wood.

Stemonitis fusca.
,, *Friesiana.*
Lycogala epidendrum.
Arcyria punicea.
,, *ferruginea.*
,, *incarnata.*
,, *nutans.*
Trichia varia.
Tilmadoche nutans.
Ceratiomyxa mucida.
All on dead trunks and branches.

T. S.

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A valuable series of notes on Insect, Fungus and other pests, is appearing in the 'Journal of the Board of Agriculture' month by month.

Mr. J. Lomas has a charmingly illustrated paper on 'The Romance of a River' in parts 4 and 6 of Cassell's 'Nature Book' (price 7d. each).

Mr. W. H. Wheeler, M.Inst. C.E., for 49 years Borough Surveyor and Harbour Engineer at Boston, Lincs., on his retirement, has been publicly presented at the Town Hall, Boston, by the Mayor, with an address of appreciation, accompanied by a silver tray weighing 150 oz. Mr. Wheeler was the designer of Boston docks.

We should like to congratulate Mr. G. W. Murdock on the completion of his fifteen years' editorship of the well-known natural history page of the 'Yorkshire Weekly Post.' Mr. Murdock has, at all times, given prominence to the observations of workers, and has not hesitated to use his scissors for clipping the wings of the many would-be naturalists, whose ambition is to soar into the unknown heights of theory, regardless of the gravitative power of fact. He detests humbug as he would the plague. He likes haggis—or should do. May his shadow never grow less.

THE BRITISH VEGETATION COMMITTEE IN THE WEST OF IRELAND.

R. LLOYD PRAEGER, B.A.

THE following notes refer to a trip in Connemara and on the northern border of Clare, carried out at the end of August, under the auspices of the Central Committee for the Survey and Study of British Vegetation. Advantage was taken of the impending Dublin meeting of the British Association, at which, it was expected, the majority of the members of the Committee would be present, to arrange a brief tour during which ecological and floristic observations might be combined. The itinerary was planned so as to allow of both the study of the leading plant formations of the district, and the seeing of the more remarkable plants of western Ireland in their native habitats.

The party left Broadstone Station, Dublin, by the 7 a.m. express on August 27th, and included Mr. A. G. Tansley and Dr. C. E. Moss (Cambridge), Mr. F. J. Lewis (Liverpool University), Dr. T. W. Woodhead (Huddersfield), and Prof. Yapp (Aberystwyth), with the writer as courier. In addition, our personnel was much enhanced by the presence of several visitors—Prof. F. O. Bower (Glasgow), Prof. F. E. Weiss (Manchester), Prof. W. E. Praeger (Kalamazoo, Michigan), Mr. Adamson (Edinburgh), and Mr. F. T. Brooks (Cambridge).

The three-hours run across Ireland from sea to sea was in itself instructive. First, the level rich grass lands of Dublin and Meath, with great hedges and many trees. Next, the poorer country of the central plain, still heavily covered with drift, often overlain with vast swelling peat-bogs ; the trees less lofty, and displaying a more marked bending towards the east, the result of the prevailing westerly winds. Then, as the drift thinned out westward, the grey limestone rock began to peep out, till near Galway it occupied the greater part of the surface, and arboreal vegetation degenerated into thorn and hazel scrub. Entering Connemara, the abrupt change of vegetation was noted where the limestone gave way to gnarled driftless metamorphic rocks ; and the wet peat, resting on the rock, supported a heath vegetation. Native trees were entirely absent, save for low dense wood on the islands in the innumerable lakes.

Disembarking at Ballynahinch Station, we had not to go a hundred yards to find the beautiful *Dabeocia polifolia* brightening a rocky knoll on the roadside, and our walk to Roundstone was enlivened by the sight of the three species of Drosera, *Rhynchospora fusca, Osmunda regalis, Pinguicula lusitanica,* and in roadside drains grand clumps of *Eriocaulon septangulare.* After lunch we visited Cregduff Lough, long known as the home of *Naias flexilis,* but the heavy rains of the previous week had raised the water-level hopelessly high, and we had to content ourselves with Lobelia and Eriocaulon, and on the knolls *Juniperus nana* and Dabeocia. On Urrisbeg Mountain hard by, the profusion of *Ulex Gallii,* extending up to about 300 feet, gave to the lower half of the hill a rich golden yellow hue. Thence to Dog's Bay, where a long isthmus of white sand, composed largely of the tests of Foraminifera, stretches out to a rocky promontory. Here we studied a dwarfed sand flora containing much *Asperula cynanchica,* and yielding such rarities as *Arabis ciliata* and *Euphrasia Salisburgensis.* It is a remarkable fact that the neighbourhood of the sandy bays of south-west Connemara, lying in the very heart of the metamorphic area with its calcifuge flora, yields many of the calcicole plants which are characteristic of the limestone 'clints' of western Ireland—*Neotinea intacta, Orchis pyramidalis, Chlora perfoliata, Euphrasia Salisburgensis, Spiranthes autumnalis,* and so on. The explanation no doubt is that the limy sand is scattered by storms, and provides the soil with the constituent needful for the welfare of these species. Out on the promontory beyond the sands we gathered Samphire, fringing the boulders on the rocky beach, and spent the last hour of daylight watching the Atlantic waves hurling themselves on the granite reefs.

Next day ample opportunities were afforded for the study of the moorland associations of Connemara. Our course lay north-westward from Roundstone across the soaking bogs to Craigga Moor, long famous as the home of *Erica Mackaii*; thence southward through a maze of lakes to Lough Bollard, and then over Urrisbeg, and back to Roundstone.

The bogs were drenching wet after the continued rains. The surface consists mainly of a comparatively smooth Molinia moor, with *Rhynchospora alba, Eriophorum vaginatum, E. angustifolium, Scirpus cæspitosus* and Sundews. In the wettest places Rhynchospora becomes the most conspicuous member. A mile or two of heavy tramping, which might be described almost equally aptly as walking or wading, made us glad to reach the rocky knoll of Craigga Moor, where the cheerful painting of Heather and dwarf Gorse told of drier conditions. *Erica Mackaii* occurs here in profusion, and was in fine flower; but a search revealed no trace of the hybrid *E. Stuarti*, nor of the double-flowered *E. Mackaii*, which gardeners have named *E. Crawfordii*. At Craigga Moor Lake the wind was high and boisterous, and only one member responded to the conductor's invitation to wade waist-deep through the boulders to study the flora of the islets. This has already been described by the writer,* and consists of a dense low growth, mostly waist-high, of *Pyrus Aucuparia*, *Taxus baccata*, *Quercus Robur*, *Ilex Aquifolium*, *Juniperus nana*, *Myrica Gale*, *Ulex Gallii*, *Arctostaphylos Uva-ursi*. Among the shaggy Ling *Listera cordata* occurs, and the canopy of bushes shelters a luxuriant growth of *Hymenophyllum tunbridgense*. Eriocaulon and Lobelia occupied sheltered inlets, with stems over three feet in length.

Thence southward across a wilderness of drenching level bog, intersected by a maze of lakelets, through which a careful way had to be steered, and over a grandly glaciated rocky shoulder to Lough Bollard, where *Adiantum Capillus-Veneris* was pointed out growing in a limy crevice of the metamorphic rock. Then up the hill into a grove of *Erica mediterranea*, growing mainly along the course of a small stream. Thence we made the ascent of Urrisbeg (987 feet), getting *Sagina subulata* and more *Erica mediterranea* and *E. Mackaii* as we went. From the summit a very remarkable panorama is spread out —eastward, a maze of sea and land; westward, a maze of lakelets and land. We descended southward, where the steeper slope and consequent better drainage brought in *Ulex Gallii* in great quantity, now in full flower; and while some returned to Roundstone by road, others had first a swim in the Atlantic at Gorteen Bay.

On our third morning an early start was made, and we drove to the base of Ben Lettery, the nearest of the Twelve Bens of Connemara. Ascending, we noticed that Molinia heath held sway up to about 1000 feet, where it gave way, apparently owing to steeper slope and better drainage, to Calluna moor, which continued up to the summit (1904 feet). *Saxifraga*

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* *Irish Naturalist*, V., 292. 1896.

umbrosa and *Arctostaphylos Uva-ursi* accompanied us on our ascent, and *Salix herbacea* was seen on the summit, but time did not allow of a search for other alpine plants recorded from this hill. A short scamper to a spur behind allowed of a fine view of the cliffs and screes of Bengorm and Bengower. A couple of hours later we were in the train *en route* for Ardrahan, lying on the flat limestone 'clints' eastward of the Burren hills. We reached our destination—a tiny village, with an excellent little hotel—in time to allow of a short ramble before dark, so we struck at once out into the flat stony country that stretches for five miles westward to where the grey bare hills of Burren rise out of the plain. Almost at once we found ourselves in the midst of the characteristic flora—sheets of *Dryas octopetala* (here less than 100 feet above sea-level), *Sesleria cærulea, Geranium sanguineum,* with much *Euphrasia Salisburgensis, Asperula cynanchica, Galium sylvestre, Chlora perfoliata, Carlina vulgaris, Gentiana verna,* etc., etc. The sun set in a glory of golden clouds as we turned homeward.

Next morning we started on outside cars, and drove westward across the flat rocky country to the base of the Burren Hills, and halting at the foot of Glancolumbkille, made the ascent of Slieve Carran (1075 feet). The way led over slopes and terraces of bare grey limestone, where Dryas and Sesleria were dominant, to the foot of the Eagle Rock, a fine range of cliffs, 400 feet in height. Along the base of the cliff a dense Hazel wood was explored. The trees are 15–20 feet high, and their canopy is sufficiently dense to preclude all but shade plants. The remarkable luxuriance of the moss flora was noted, in striking contrast to the vegetation of the bare crags around. Then we climbed the cliff, first through a loose Birch-Ash wood, then over Dryas-covered ledges. The broad top of the hill proved heathy, with immense quantities of Dryas. On the crowning cairn grew *Arenaria verna* and *Saxifraga hypnoides.* Descending the hill, and reaching the vehicles again, we drove through very remarkable country, absolutely bare terraced hills of limestone, with valleys thickly clothed with Hazel and Birch wood. Starting again on foot from the base of the hills, and striking out into the plain, a rough bit of going—made more difficult by the fact that we had now reached the water-level, and most of the meadows were flooded—we reached Castle Lough, where *Potentilla fruticosa* was studied growing in abundance among the rocks. Another rare plant obtained here was *Teucrium Scordium.* It grows in the central depression of a large green meadow, which now presented the appearance of a broad lake. However, this was an excuse for a bathe, and the plant was speedily obtained from under three feet of water. A few miles of walking over the 'crag' country brought us at last to the welcome cars, and darkness had long fallen ere we reached Ardrahan.

Our last day opened threatening, and rain was soon falling heavily. But with the faith of naturalists, we took the morning train to Gort, and tramped out to the interesting ecclesiastical ruins—cathedral, churches, and round tower—of Kilmacduagh, and thence northward to the woods and turloughs of Garryland, where we were rewarded by a gloriously fine afternoon. The woods of Garryland are mainly natural, with much Oak, Ash, and Hazel, and also Birch, Yew, Mountain Ash, Holly, etc ; the whole fringed in places with a remarkable scrub of *Juniperus nana.* The woods excited much interest and keen discussion. and some hours were profitably spent in them. Garryland Lake also came in for a share of attention, and the curious flora of the turloughs was studied. These turloughs are depressions in the limestone, which are lakes in winter, and dry pasture in summer. Owing to the deposition of sediment, they present the appearance of expanses of the freshest grass, and an interesting zoning of the constituent plants may be observed. The winter high water-mark is clearly shown by the sudden incoming of *Rosa spinosissima, Juniperus nana,* etc., backed by scrub and wood. We lingered long about this picturesque and interesting place, and then strolled back to Gort for a cup of tea before train time. Next morning we left for Dublin and the duties of the British Association meeting, and so closed a trip in which purely botanical interest was supplemented by a great variety of scenery and of physical conditions, and made doubly enjoyable by the scientific enthusiasm and hearty good-fellowship which prevailed.

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Modern Lithology: Illustrated and Defined, by **Ernest Howard Adye.** Edinburgh : W. and A. K. Johnson, Ltd. 128 pp.

In this handy volume the author gives a large number of typical rock sections, beautifully coloured, shewing their appearance under ordinary conditions, and under polarised light. With each is a clear description of the different minerals, etc. visible on the slide. The book is evidently prepared for the use of University, Technical and Civil Service students, and is arranged so as to meet their requirements. There is a good list of works worth consulting, a well-prepared index, and an extensive and valuable glossary of terms used.

NOTES ON THE MOLLUSCA TAKEN FROM BRITISH BARROWS IN EAST YORKSHIRE.

Rev. E. P. BLACKBURN.

THE following list contains particulars of the different species of shells in the Mortimer Museum at Driffield, which have been obtained by Mr. Mortimer whilst excavating the various barrows in the district, full particulars of which appear in his 'Forty Years' Researches.' The examinations I have been able to make have been brief, and at intervals ; but have been more than cursory. Still I think that careful measurements should be made, and, if possible, photographs procured of the shells for a thorough comparison. Some of the shells are in very good condition ; a few are thrush or mouse eaten. The epidermis is, of course, absent, but the colouring matter of the bands of *Helix nemoralis* and the markings of *Helicigona arbustorum* are plainly seen in some of the specimens. The yellow colour of the yellow type of *Helix nemoralis* is also quite distinct as well as in some cases the reddish-yellowish colour in lip markings.

There were specimens (from Barrow 2, Oxdale lands near Huggate) of the large *Helix nemoralis* depressedly globular, yellow coloured without bands, with dark lip, similar to those referred to in Mr. Clement Reid's monograph on 'An early Neolithic Kitchen Midden at Blashenwell.'

In reviewing my notes, I see that the yellow type seems to predominate, although the five banded type is to be found. The relative proportion of the unbanded and banded types is a point which needs looking into, as well as the question whether the specimens of *Helix hortensis* are of the banded or unbanded type. At Blashenwell they were of the five banded type. My notes are not clear upon this point, and I am now too far away to investigate it.

I am well acquainted with recent shells from all parts of the district, and after examining them my opinion is that the shells from the barrows are not materially different from the recent ones. The *Succinea putris* are larger than any I have seen in the district. We have taken them of that size in Gloucester, and there are some of like size in the Manchester University Museum, but they are rare.

Acicula lineata has been taken of late years at Tibthorpe, and it can be reasonably expected to be found at Garton Slack, although I do not know of any such recorded find. The other species are found pretty generally throughout the Wold District.

Mr. T. Sheppard, who suggested the compilation of the list, has supplied the names and localities of the barrows.

Commenting on the finds, Mr. Sheppard says:—'Whilst it is possible that some of the specimens may have been incorporated in the graves in comparatively modern times, it can be taken that the greater part were undoubtedly interred, most probably accidentally, during the construction of the barrows, *i.e.*, during the Bronze Age. The positions in which some were found were such that in Mr. Mortimer's opinion, they must have been contemporaneous with the burials.'

Mr. Clement Reid, in his Blashenwall article, considers that it is probably a mistake to think that land snails are not of much account in fixing the age of deposits. He considers that by examination of land shells abundant in the barrows, the date of their introduction by man may be arrived at, and that they may be used for fixing the date of other antiquities of doubtful age.

Whilst giving all due weight to the opinions of those who have made a life study of the barrows, I am somewhat sceptical as to the value of land snails as a means of fixing dates, and am not yet convinced that we can *absolutely* say the shells are contemporaneous with the human remains. All conchologists know how strangely *helices* manage to insinuate themselves in all kinds of unlikely places. The presence of the great burrower *Caecilianella acicula* (in Barrows Nos. 65 and 140), would point in the other direction, viz., that possibly the shells have got in the barrows in other ways.

On the other hand, one cannot overlook the fact that *helices*, when kept from exposure to air, preserve their colour and texture indefinitely. Semi-fossil *helices* also seem to differ little in appearance from recent ones which have been exposed to the air and weather for a long period. These facts would go towards confirming the view that the shells and human remains are of the same date. Much needs yet to be done before these points are settled, and one can devoutly hope that someone with the necessary time and opportunity, will gather together the facts needed to give more conclusive evidence on these various points.

List of Mollusca taken by Mr. J. R. Mortimer from British Barrows in East Yorkshire, and now in the Mortimer Museum, Driffield.

No. of Tumulus.	Locality.	Species.	Remarks.
37	Garbutt's Garton Slack.	*Helix nemoralis.*	Large in size. Found with a skull. One specimen only.
140	Garton Slack.	*Acicula lineata.*	Very fine.
146	,, ,,	*Vallonia pulchella.*	Found in a skull.
161	,, ,,	*Acicula lineata.*	
51	Near Aldro.	*Littorina littorea.*	One specimen.
		Acicula lineata.	Well known burrowers.
52	Swinham Plantation, Aldro.	*Helix nemoralis.*	
65	Birdsall Brow.	*Helicigona arbustorum.*	Very fine, and well marked.
		Helix nemoralis.	Of the yellow type. No very broad united bands. In one case the lip was still of a reddish colour; in another of yellow colour. Found at the bottom of the grave and all the way up to the summit of the mound above the grave.
67	Birdsall Brow.	*Helicigona arbustorum.*	A very large one, the largest I have seen in the district. The marking clear and the band clear. One shell only.
		Helicella cantiana.	
		Hygromia hispida.	
		Helix nemoralis.	Banding of type.
		Helix hortensis.	
		Vitrea cellaria.	
		,, *alliaria.?*	
		Succinea putris.	Very large, ¾″ by nearly ⅜″.
		Helix nemoralis.	
		,, *hortensis.*	
		Vitrea cellaria.	
110	A long barrow. Hanging Grimston.	*Helicigona arbustorum.*	Very fine. Found at the bottom of gallery, and at half depth. One specimen repaired by the mollusc.
2	On Ox Lands Dale, near Huggate.	*Helix nemoralis.*	One specimen, flat and broad, lip broad. One very large, over 1″; ⅞″ from apex.
		,, *hortensis.*	
249	Huggate.	,, ,,	
284	(1894) Wold Newton.	,, *nemoralis.*	One shell with deep band, one with plain line. One a very thick shell, mouth broken; marking good.
294	Lingwalk Wood, nr. Sledmere Monument.	*Helix nemoralis.*	Three specimens.
		,, ,,	? Thrush eaten.
277	Willie Howe Plantation in Sledmere.	,, ,,	Yellow type. From the grave and the body of the mound.
		Helicigona arbustorum.	
		Helicella itala.	
		Pyramidula rotundata.	
		Vitrea cellaria.	With fine polish on.
		Helicigona arbustorum.	
		Helix hortensis.	With some sheen on
	Cottage Chalk Pit, Sledmere	*Helix hortensis.*	One specimen.
	Esks Road Barrow, Helperthorpe, 1868.	*Helix nemoralis.*	Two ? thrush eaten.

1908 November 1.

NOTES ON A FLOCK OF PALLAS' SAND GROUSE IN EAST YORKS.

W. H. ST. QUINTIN, J.P., M.B.O.U.

I BELIEVE that, early in the summer, a few examples of Pallas' Sand Grouse were reported from the Eastern Counties. But I have not seen notices of any considerable numbers having been seen anywhere in these islands, as in 1888. However, a flock of between 30 and 40 individuals of this species was noticed early in June, on the northern slope of the wolds, above the village of Knapton; and it is interesting to note that in spite of change of season and varying conditions as to crops of arable land which they have frequented, a considerable number of them remained at any rate until the beginning of the present month (October). I did not happen to hear of the birds till the end of August; but on the 29th I went up to the fields which they had been generally seen upon—'old seeds,' and turnip fields, where, owing to the droughty season, the crop had partially failed, leaving the ground bare; and my companion saw nine of them, though I, at some little distance, was not so fortunate. They rose quite 80 yards off, and dashed off with a sweeping flight over the brow of a little hill, and we could not find them again that day.

On September 5th and 19th they were found again, on the latter date 20 or more in one straggling flock; and on October 1st about nine were flushed. But they always rose very wild, and never gave us an opportunity of watching them. Probably they generally saw us at a distance and squatted, and remained invisible until they felt themselves being approached too closely. On several occasions their chattering cry was heard as they flew. There are two dew-ponds near the locality, and probably the birds drink at each of them. But unfortunately the ponds are newly bottomed with chalk-grit, and I have searched in vain for footprints on the margins. However, seven birds were seen to rise from one of these ponds on one occasion. I have never been able to trace their movements after they have been flushed. Probably they always flew to some other suitable ground, where they were not recognised. Nor can I hear that they have been noticed elsewhere in the district. Their habit of rising wild, and quickly putting a fence or rising ground between themselves and the person disturbing them, has caused them no doubt to be overlooked.

So far as I know, the birds have never been molested during the four months they have been here.

The wings and legs of one which was picked up near a post-and-wire fence have been shown to me. It was a female bird, and nearly through the moult, except that the first four primaries had not been shed at the time of its death. The only recognisable food in the gizzard was clover seed, no doubt picked up on the 'old seeds.' Apparently this flock never broke up into pairs, and there is no evidence that the birds have ever attempted to breed.

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A Guide to the Domesticated Animals (other than horses). British Museum. Cromwell Rd., London, 1908. 54 pp., 6d.

This is a further useful and cheap guide issued by our National Museum. It is written by Mr. R. Lydekker, and is illustrated by twenty-four blocks. The introductory pages refer to the various breeds of English Cattle, a subject of peculiar interest to our readers in view of the contribution recently appearing in our pages. Amongst the other animals dealt with are sheep, pigs, dogs, cats, ferrets, guinea-pigs, rabbits, rats and mice, pigeons, poultry, ducks and geese, and canaries. We cannot sufficiently recommended these exceedingly cheap and useful publications.

'The Birds of Handa,' Sutherlandshire, is the title of the well-illustrated Presidential Address of **Dr. S. H. Lang** to the **Norfolk and Norwich Naturalists' Society,** appearing in its Transactions for 1907-8, recently to hand. The volume is a particularly interesting one, and amongst the many articles we notice 'Distribution of *Veronica verna* L., *V. triphyllos* L., *Herniaria glabra* L., and *Scleranthus perennis* L.,' by A. Bennett; 'Notes on a Tame Hare'; 'The Occasional Luminosity of the White Owl'; 'Norfolk Neolithic Harpoon-Barbs, etc.,' by W. G. Clarke; 'Some Breckland Characteristics'; 'Notes on the Herring Fishery of 1907'; 'Additions to the Norwich Museum,' etc.

The Viking Club continues to publish its 'Saga Book,' and also the separate volumes dealing with **'Orkney and Shetland Old Lore,'** both of which are indispensable to all students of northern antiquities. Of the former, Volume V. part 2 is the last issued, and of the latter part 7 has recently made its appearance. The 'Saga Book,' in addition to containing various original articles by well-known specialists, has some useful notes on current topics, contributed by the editor, Mr. A. F. Major; and there is also a good series of reviews. To even enumerate all the interesting items in these useful publications would be a lengthy matter, but amongst them we notice in the Saga Book 'Some Illustrations of the Archæology of the Viking Age in England,' by W. G. Collingwood; 'Ship Burial at Kiloran Bay, Scotland'; 'Western Influence on the Earliest Viking Settlers'; 'The Viking Ratf or Pontoon Bridge discovered at Glamford-Brigg, Lincs.'; etc., etc. The reports from the district secretaries are also very useful. In one, by Dr. Auden, we notice photographs of 'A Viking Ship on a Church Door' at Stillingfleet, Yorks. In Mr. Collingwood's article there is an illustration of a Hogback at Lowther, Westmorland. On this is a representation of a boat, armed with eight men, each with two round shields—an upper smaller, and lower larger one. The similarity between this and the well-known images from Roos Carrs is most striking. In the volumes dealing with 'Orkney and Shetland Old Lore' are papers on 'The Romans in Orkney and Shetland'; 'Some Old Time Shetland Wrecks'; 'Shetland Phrase and Idiom'; etc,. as well as numerous short notes of interest. The Viking Club is doing most useful work, and should be encouraged.

JUNCUS ACUTUS L. IN NORTH-EAST YORKSHIRE.

P. FOX LEE,
Dewsbury.

With reference to my note in the 'Naturalist,' 1906, p. 92, on the addition to the North Riding Flora of *Erythræa pulchella* (or *Centaurium pulchellum* Druce, Oxford List of Plants), I find now that a still better addition to the Flora of the County as a whole was observed by me in July 1905, upon one of the salt-marsh flats near East Coatham, Redcar, namely—*Juncus acutus*—the great sharp-fruited Sea Rush. This latter plant, strongly growing in circular tufts, 3-ft. high, was quite the particular feature of the area, having for its companion the tiny rose-starred flowers of the Centaurium. At the time of gathering I confused this *Juncus acutus* with the commoner *J. maritimus*, finely developed, and sent dried specimens of the few I gathered with the Centaurium and other things from the same district to Mr. J. G. Baker, the author of 'North Yorkshire.' Somehow, my gathering of *Juncus acutus* in Yorkshire* must have been shewn to Rev. H. J. Riddelsdell by Mr. Baker, and he, apprehending its importance, made a note of it for the 'Journal of Botany,' in which it appears, (1906, p. 105). Only a few days ago my friend, Arnold Lees, quartering the botanical highways and byways of print for data on distribution for his Supplement to the West Yorkshire Flora, drew my attention to the matter, and I have supplied him with a specimen in confirmation of the name, and now hasten to place on record in 'The Naturalist' the occurrence of this very restricted British plant in our county of broad acres. London Cat., Ed. 10, gives it a vice-county census of 16; this for '62' being included, as also that for 11 S. Hants. As an unquestioned native, Topogrl. Bot. Ed. 2 (1883) shews it to grow from Devon East, through Sussex and E. Kent, up to Norfolk West (Newbould)—the 'Wash' saltings; and north up the Welsh coast from Somerset to Carnarvon (Ley, 1886); Flint Shore, Westmorland (Lonsdale) flats and Kircudbright shore being 'insufficiently vouched,'—in Watson's own non-committal phrase. Druce's Oxford List gives it for fifteen county areas only in England; four in Ireland and Sarnia—where along Vazon Bay it has been known over a century. Its earliest British record was for near Harlech, Merioneth, so far back as 1641 (How's 'Phytologia,' 63).

NOTE ON *JUNCUS ACUTUS* L.

F. ARNOLD LEES, M.R.C.S., Etc.
Leeds.

THIS East Coatham Rush is undoubtedly *Juncus acutus* Linn., and must be reckoned a significant extension of its East Coast Range in England. It has not yet turned up in Scotia, if we except a doubtful report of it from the Kircudbright littoral—where it may well have occurred as an Alien ; but there is an early record of it for the 'Wash' marshes of Lincolnshire in Thompson's 'Boston,' (1856), a likely area that produced *Statice reticulata* and *Althœa officinalis* e'en tho' these be 'gone' now. It might be being too acute to say that it is *the J. maritimus* of 'North Yorkshire,' p. 292, Ed. 1. (1863), and (unaltered phrase) 'amongst the sandhills in front of the village of Coatham,' p. 338, Ed. 2, 1892 ; although it seems strange that, *if* there, in the quantity Lee found it in 1905, the bold, noticeable Rush escaped 'the seeing eye' at the earlier dates in 'classic' ground of which particular mention is made in 'North Yorkshire' (Ed. 1, p. 140, Ed. 2, p. 188-9). It is, further, sorrowing to note how little up-to-date the Second Edition of Mr. Baker's pioneer work was brought. This is case 12 or 13—a baker's dozen !—in which a ver-species has come to light to upset our reckonings. The other view to take is to deem it a suspect, brought with ships' ballast sand, if where it grew, between the rail-line and the front, shewed any sign of having been a 'tip.' My own idea is that the seed was washed there by the North Sea currents at some high tide in years gone by ; in other words, a *Native Waif !* a *late* comer comparatively, and one of those hitherto too much overlooked factors in Natural Change which reinforce the flower-basket of every wild garden (more or less, the shore-plots more) and compensate for the equally natural losses of time and Elemental circumstance.

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The Rev. J. Conway Walter sends us a note recording the nesting of a partridge very close to a much frequented highway at Horncastle. Partridges are occasionally erratic in this way.

We have received part II. of a new journal, 'The Scientific Monthly.' It has notes on 'The Shape of the Visible Universe,' 'Dyeing,' 'Geology' (very general), 'Electricity,' 'Beautiful diatoms,' and some shorter notes of a Tit-Bits type. We cannot say what service the new venture will perform, but time will tell.

FIELD NOTES.

GEOLOGY.

Ice-Borne Boulders of Yorkshire. — Mr. Bayford of Barnsley draws attention to the omission from the list of Shap Erratics in my summary of the work of the Yorkshire Boulder Committee, of the boulder found at Adwick-on-Dearne, and now in Weston Park, Barnsley.

Curiously enough this well-known boulder appears never to have been officially reported either to the British Association or the Yorkshire Committee. It is referred to in the 'Naturalist' for 1899, p. 124, and is figured in the 'Proceedings of the Yorkshire Geol. and Pol. Society' for 1905, Vol. XV., Part III., p. 418. It weighs 7¼ cwt.—J. H. Howarth, Halifax.

Bones of Reindeer at Hessle.—In re-examining the collection of mammalian remains from the pre-glacial gravels at Hessle, near Hull, in the Hull Museum, which I obtained some time ago, I find there are the humerus, radius and ulna of a reindeer (*Cervus tarandus*). They are from the angular chalk gravel which occurs below the boulder-clay, and exhibit no signs of having been waterworn. Some pieces of antler from the same bed are probably of the same species, but owing to their fragmentary condition, positive determination was not possible. The record appears in 'Geological Rambles in East Yorkshire,' marked with a '?.' The bones now recorded, however, place the presence of the reindeer at Hessle in pre-glacial times beyond doubt.—T. Sheppard, Hull.

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LEPIDOPTERA.

***Sphinx convolvuli* at Leeds.**—I have had brought to me two living specimens of *Sphinx convolvuli*—one on August 29th, and the other on September 21st. Both specimens were found at rest in the Leeds City Square, probably attracted by the arc lights. As the specimens were in perfect condition, they are not likely to have travelled far, and may have entered the city by the railway or by the electric cars from outlying districts. With the second specimen I also received examples of six other species of lepidoptera from the same spot in the city.—E. O. Croft, Leeds, September 21st, 1908.

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COLEOPTERA.

***Enicmus fungicola* Thoms. at Leeds,**—On August 10th last I was pleased to find *Enicmus fungicola* Thoms. in small numbers, on an alder tree at Adel Moor, Leeds. It was first noticed as a British species last year (see 'E. M. Mag.', 1907, pp. 103-104). I have to thank Mr. E. A. Newbery for kindly identifying the species.—E. W. MORSE, Leeds, 16th October, 1908.

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NEUROPTERA.

Calopteryx virgo near Tadcaster.—The Rev. Cyril D. Ash has sent me specimens of the very pretty dragon-fly *Calopteryx virgo*, which he took at Saxton, near Tadcaster, in 1907. When the Y.N.U. visited Tadcaster several years ago I found the other British species *C. splendens* to be common on the Wharfe there, and it is now satisfactory to know that both occur in the district.—GEO. T. PORRITT, Dalton, Huddersfield.

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INSECTS.

Insects at Donnington-on-Bain, Lincs.—During a holiday spent in Lincolnshire in August and September of this year, I collected the following insects, which have been kindly named for me by the Rev. A. Thornley :—

COLEOPTERA.—*Sermyla halensis*, Mere ; *Cistela murina* L., *Necrophorus humator*, *Philonthus politus*, *Pristonychus terricola*, *Quedius tristis*, and *Rhagonycha fulva*, Donnington-on-Bain ; *Dorcus parallelopipedus* L. This was taken by my friend Mr. E. M. Walker and myself on the occasion of the excursion of the Lincolnshire Naturalists' Union to Well Vale, August 30th.

HYMENOPTERA.—*Ammophila sabulosa*, Mablethorpe ; *Bombus agrorum* and *Bombus terrestris*, Donnington-on-Bain ; *Ophion* (species ?), Calcethorpe—W. WRIGHT MASON, B.A., St. Mary's Bootle.

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FLOWERING PLANTS.

While in Lincolnshire during the past summer, I had the good fortune to discover a plant which had not been recorded previously for the county. This new record was *Scrophularia Ehrharti* Stev. (=*S. alata* Gilb. and *S. umbrosa* Dum.). It was found in an open space in a small wood by a stream in the parish of Mere (County Div. 13). The specimen is now in the County Herbarium.—W. WRIGHT MASON, B.A., St. Mary's, Bootle.

REVIEWS AND BOOK NOTICES.

The Architectural, Archæological and Historic Society of Chester has issued the 14th volume of the New Series, which is a very useful publication. Antiquities are well looked after in Chester. Amongst the papers are 'The Coins of the Potter Meols Collection,' in which reference is made to a remarkable collection found on the Cheshire shore, as a result of the erosion by the sea; 'The Chester Mystery Plays,' and 'The River Dee.' The last, by Mr. F. Simpson, is a valuable contribution to the geology and history of the river, which is well known by Kingsley's 'Sands-o'-Dee.' A recent letter is also quoted from Miss Kingsley, proving that in this poem her father meant the Cheshire Dee, and not the Scotch Dee, as some suppose.

The Land's End, a Naturalist's impression in West Cornwall, by **W. H. Hudson.** London: Hutchinson & Co., 1908. 10/6 net.

We have read this book carefully, and must say we like Mr. Hudson much better when he is describing the birds and donkeys than when he is describing the men and their ways. Not that there is anything very serious to complain about in his accounts of Cornish men, their manners and their alleged lack of humour; nor even can we find much fault with his horror of the Wesleyans there, who sing—'Hell's foundations tremble at our shout of praise.' 'And no wonder,' the author adds, after having 'sat out' a service or two. But really, the way the Wesleyans and their 'awful ways' are dragged in, detract from the beauty of the book; and one really wonders whether a much more successful volume would not have been produced had Mr. Hudson kept to the gulls and the jackdaws, respecting which he gives some delightful stories; for Mr. Hudson is a naturalist of the sort that despises those 'hasty schedules or inventories of God's property made by some clerk,' as he terms the 'local ornithologies and lists of species!' 'The Land's End' is written after a style which is quite refreshing, and all visitors to that district will do well to peruse this volume—full of anecdote, and charmingly written. It is also excellently illustrated.

The July number of the **Bradford Scientific Journal** is an excellent one, though the copy we have received is a bit belated and battered. Miss M. A. Johnson writes on Equisetales and Horsetails, and tells tales of Chamaeleons and their tales; both papers being valuable. We regret we cannot see the meaning of the editorial footnote to this paper, unless the word 'botanical' has been omitted before the word 'papers,' and then it would hardly be accurate. Mr. S. Margerison continues his most useful notes on the Vegetation of some disused quarries (illustrated by excellent photographs), and also writes on Hawks and Falconry. Mr. W. R. Butterfield gives some 'Suggestions for a Museum at Bradford.' Perhaps in years to come we may find a note on 'The Bradford Museum, an accomplished Fact.' There are also notes on bees and wasps, plant lore and pre-historic remains.

We have received the **Report and Proceedings of the Manchester Field Naturalists' and Archæologists' Society for the Year 1907,** (xvi. + 108 pp., 1908).

This volume is occupied by a chatty report of the various excursions and meetings of the Society, written in a 'popular' way. Its contents are exceedingly varied, as will be seen from the following headings, taken from pages 2–8:—How Plants protect themselves; Manchester Academy of Fine Arts; Manchester Fire Brigade and Electrical Power Station; Chorlton Union Workhouse; Interesting Archælogical Excursion; and The Bollin Valley. There are also papers on Spain, the Lake District, Lincoln, etc.; but there is not much relating to the natural history of the Manchester District.

How to Attract and Protect Wild Birds, by **M. Hiesemann.** Witherby & Co., 1908. 86 pp., price 1/6 net.

This is an English translation by Emma S. Bucheim, of a German work, devoted to the best methods for the encouragement and protection of wild birds. Hints are given as to the growth and pruning of vegetation, in order that suitable nesting sites may be secured, and in addition, the various types of nesting boxes are described and figured.

An Annotated List of the Alien Plants of the Warrington District. Mem. & Proc. Manch Lit. & Phil. Soc., Vol. 52, Part III., No. 15, 1/-.

We have before us Mr. G. A. Dunlop's List of Alien Plants found in the Warrington district, *i.e.*, within a radius of ten miles of Warrington, Lancashire. It contains about 160 species with appended notes. That such a list is interesting and useful, goes without saying; but to us the most pleasing feature is that it is work done on objects often considered as only a nuisance, which are close at hand and generally very familiar. Of course, to the nature student, the idea of pest or nuisance does not enter the head. The Warrington List is not a very large one compared with lists from other estuarine ports, *e.g.*, those of the Humber, but this may be due to the imports, or perhaps on account of there being a less area in Lancashire as a dumping ground. Mr. Dunlop has had the usual difficulty, we fear, as to what should be included and what rejected in his compilation. This follows, we think, from the somewhat narrow view (pardon our heresy) as to the terms 'Native,' 'Denizen,' 'Colonist,' 'Casual,' etc. It has often struck us as scarcely needful that such groups should be insisted upon at all, especially as the drawing of the lines of delimitation must always be so difficult, and because of other reasons which we think make them altogether too arbitrary. There was a time, not so remote geologically, when no flowering plants, or very few indeed, would be found in our northern counties at all—say after the Ice Age. So our present plants have arrived, certainly not all at once, nor yet by any but very diverse, and quite natural, agencies. This alone makes the fixing of native, denizen, etc., very difficult, arbitrary, and, as all our artificial means are only phases of the natural, we think scarcely necessary. Heretical it may seem, but we plead for a broader outlook. Why should *Papava Rhœas, Reseda luteola, Cytisus scoparius, Carduus acanthoides*, for example, be dubbed alien even in Lancashire? or why should *Lychnis githago, Lactuca muralis*, etc., be excluded! Surely the latter group is as much entitled to rank as the ormer, or more correctly, why exclude any of the above? Then again, some species are always going to extinction, just as species 'new to the locality' are appearing from time to time, and both by quite natural means. We have no fault to find with the list under consideration, but one or two notes strike us as being remarkable, *e.g.,* that under *Ranunculus sardous*, where this species seems to be included in 'these marsh plants.' We have never seen *R. sardous* in any but dry land habitats; the experience of Lancashire observers may, of course, be altogether different. The ordinary flora of Lancashire, too, must be rather a limited one if species like *Viola odorata*, *Cytisus scoparius*, and *Euonymus europœus*, formerly reckoned natives in many other parts of the British Isles, are not included. Our point is that all plants found on a dumping ground are not necessarily aliens. It is very interesting to notice that the same recently introduced plants occur again and again in the 'alien' lists of various seaport or estuarine places on all sides of our islands. Of Mr. Dunlop's 160 species, 116 occur also in a list for the Hull Docks (*vide*, 'Flora of the East Riding of Yorkshire,' 1902). Remarks on the extinction of alien plants are also interesting and suggestive. We have noted the same thing in Yorkshire. At first the alien plants are often weakly annual forms; later their place is usurped by more vigorous rampant forms, generally grasses. We welcome the publication of Mr. Dunlop's and all such carefully compiled contributions to our local flora and florulas.

J. F. R.

NORTHERN NEWS.

A British bronze sword, 23 inches in length, found at Leven some years ago, has been purchased by the Hull Museum.

Mr. N. H. Joy contributes a note on '*Anistoma flavicornis* Ch.,' an addition to the British list of Coleoptera, to the 'Entomologist's Monthly Magazine' for August.

'Natural History as a Hobby' is the title of a paper appearing in the 'Hull and East Yorkshire Teacher' for July and October, from the pen of the Secretary of the Yorkshire Naturalists' Union.

From Mr. H. Brantwood Muff we have received a useful 'Report Relating to the Geology of the East Africa Protectorate' (1908, 63 pp.). This is the result of Mr. Brantwood Muff's work there in 1906.

We notice that a 'useful' natural history hint is given in a certain paper. 'To remove stains from cloth :—"*Heat a little petrol*, and sponge the stains with it."' You will also probably 'remove' the cloth.

In the September 'Geological Magazine' the editor, Dr. H. Woodward, has an interesting paper 'On some Coal-Measure Crustaceans with Modern Representatives.' Specimens from the Derbyshire Coal-beds are referred to.

At the celebration of the jubilee of the British Ornithologists' Union, to be held in London in December, gold medals will be presented to the four original members, Dr. F. Du Cane Godman, Mr. P. S. Godman, Mr. W. H. Hudleston, and Dr. P. L. Sclater.

Mr. F. Boyes, of Beverley, informs us that a quail in his possession has laid fifty eggs in one season ; and that a painted quail in the possession of Mr. W. H. St. Quintin has laid over seventy eggs. In each case the weight of the eggs is considerably over that of the bird.

'The West Riding County Council Vacation Courses' is the title of a pamphlet issued in August. It includes many items of interest to the teachers who spent their holiday at Scarborough. Amongst others, Mr. D. W. Bevan writes on 'Wild Life round Scarborough.'

Second editions have recently been called for of Hull Museum Publications, Nos. 5 and 41, dealing with 'An Unpublished Manuscript Map of the River Hull, dated 1668,' etc., and 'a Guide to Wilberforce House,' respectively. They are on sale at the Museum at one penny each.

Judging from its Annual Report just to hand, the Manchester Museum has many friends. It recently had an opportunity of securing a fine series of Egyptian antiquities for £500, and within a few weeks £570 was raised. A further sum of £5000 has also been given to erect a building for the Egyptian collection.

It is reported that during boring operations for water at Messrs. Plews' Brewery, in the Vale of Mowbray, Wensleydale, an important discovery of ironstone has been made. 'The work is being carried out by Messrs. Isler, of Southwark, and the strata passed through includes grey limestone, flaky sandstone, gypsum, shale, conglomerate, light limestone, and grit. A seam of ironstone 10 feet thick was found over 300 feet down.'

In a note on 'The Cambridgeshire Fens' in 'Fenland Notes and Queries' for October, it is stated that there are three theories to account for the submergence of the forests in the Ely area. (1)—The interference of the Romans ; (2)—A change in the coastal line through the action of the sea ; and (3)—Earthquakes attended by subsidence.' We were hardly prepared for the following :—'The third theory is . . . . that the present low level of the Fens and their forests is the result of volcanic action, perhaps attended by earthquakes, but certainly by subsidence, and this, the most marvellous of the three, is probably the true one !'

3 NOV. 1908

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THE BIRDS OF YORKSHIRE.
A HISTORICAL ACCOUNT OF THE AVIFAUNA OF THE COUNTY.
By THOS. H. NELSON, M.B.O.U., Redcar,
With the co-operation of W. EAGLE CLARKE, F.L.S., M.B.O.U., and F. BOYES.

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A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY
T. SHEPPARD, F.G.S., F.S.A.Scot.,
THE MUSEUM, HULL;

AND

T. W. WOODHEAD, Ph.D, .F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

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Annotated List of the LAND and FRESHWATER MOLLUSCA KNOWN TO INHABIT YORKSHIRE. By JOHN W. TAYLOR, F.L.S., and others. Also in course of publication in the Transactions.

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LIST OF YORKSHIRE COLEOPTERA. By REV. W. C. HEY, M.A.

THE NATURALIST. A Monthly Illustrated Journal of Natural History for the North of England. Edited by T. SHEPPARD, F.G.S., Museum, Hull; and T. W. WOODHEAD, F.L.S., Technical College, Huddersfield; with the assistance as referees in Special Departments of J. GILBERT BAKER, F.R.S., F.L.S., PROF. PERCY F. KENDALL, M.Sc., F.G.S., T. H. NELSON, M.B.O.U., GEO. T. PORRITT, F.L.S., F.E.S., JOHN W. TAYLOR, and WILLIAM WEST, F.L.S. (Annual Subscription, payable in advance, **6/6** post free).

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CLAPHAM: ITS GEOLOGY AND NATURAL HISTORY.

The Yorkshire Naturalists' Union held its 212th meeting at Clapham, during the week-end commencing September 5th. There was a very good attendance, and every attention had been paid to the local arrangements by Mr. W. Robinson, the divisional secretary. On account of the nature of the district, the party was naturally largely geological, and was exceptionally fortunate in securing the services of the veteran geologist, Prof. T. McKenny Hughes, F.R.S., as leader. His presence added great interest to the excursion.

At the evening meeting, held at the headquarters on September 5th, Mr. G. T. Porritt occupied the chair. Thirteen affiliated societies were represented. Votes of thanks to the landowners and leaders were passed, and reports on the work accomplished were given by Messrs. Booth, Roebuck, Porritt, Waterfall and Hawkesworth.

For VERTEBRATE ZOOLOGY, Messrs. W. H. Parkin and H. B. Booth report that their section was well represented—eight ornithologists being present. As there had been considerable discussion in the columns of a Yorkshire weekly paper, respecting the status of the Stonechat in the Clapham district, and very divergent views had been expressed, a thorough search was made for the bird in the most suitable places. The party worked in two sections. One section searched Clapham Common and its neighbourhood, eventually working round to Austwick Moss; the other worked the south side of the railway line; but both parties reported that not a Stonechat had been seen. The total number of species identified on the Saturday was forty-six, to which four mammals and four birds were added by some members who remained over the week-end. There were in all seven mammals, forty-five birds (including nine lingering summer visitors), one amphibian, and one fish. In addition, one or two species of bats were common in Clapham village, but could not be correctly identified.

Perhaps the most interesting bird seen was a Common Gull (*Larus canus*)—a by no means *common* bird in most parts of the West Riding. Flocks of Lesser Redpolls were numerous, and occasionally were intermingled with a few Linnets and Twites. Several Herons were seen. Snipe were very abundant at Austwick Moss; a 'whisp' of eight birds rising from one small pool, and fourteen from another.

Entomology.—Mr. G. T. Porritt writes :—With a keen, piercing wind, as cold as in mid-winter, little was expected entomologically. *Polia chi* was not uncommon on the stone walls, but all of the palest and most ordinary form, the dark varieties one is so familiar with in South-west Yorkshire, being apparently entirely wanting. *Peronea sponsana* was common in beeches ; and larvæ of *Bombyx rubi* seemed to be also fairly numerous on grass. The Trichopteron *Anabolia nervosa* was abundant all along the river banks, where also a much larger *Halesus* was seen, doubtless either *radiatus* or *digitatus*, but the only specimen escaped before its absolute identity was established. Other Trichoptera and Neuroptera included *Lepidostoma hirtum, Leuctra kläpaleki, Hemerobius subnebulosus, H. lutescens*, etc.

Geology.—Mr. E. Hawkesworth writes :—There is much to be said in favour of visiting areas in which a similar succession of rocks is exposed, at short intervals, thus making comparison easier. Ingleton in 1906, Horton last year, and now Clapham have afforded the members of the geological section opportunities of examining and comparing the pre-Carboniferous rocks occurring in each district, and it is hoped that in 1909 an excur- sion will be made to Sedbergh, then, with the exception of one or two small exposures, the areas occupied by the older rocks of the county will have been visited.

Some of the geologists arrived on the Friday morning, spending the remainder of the day in going over the route fixed for the Saturday. About a dozen spent the week-end in the district, and, with the addition of others who came for the Saturday, the section was very well represented. When making preliminary arrangements for the excursion, the writer casually met Professor T. McKenny Hughes, M.A., F.R.S., F.G.S., Woodwardian Professor of Geology in the University of Cambridge, who took part in the Geological Survey of the district, and for many years past has spent considerable time in elucidating its structure. Eventually, after the circular had been printed, he decided to be present. His explanation of the geology, his general information about the district, his unfailing store of humour and anecdote, will long be remembered by those privileged to accompany him.

Going east from Clapham, the first call was made at a gravel-pit on the side of the hill near the Ingleborough Home Plantation, just over five hundred feet above sea-level. The section shows current-bedded gravel, containing a large quantity of stones, some very large, and many of them ice-scratched, all apparently of local origin. There is a similar exposure a little further to the west, and the leader said these puzzled him more than any others of the many and intricate problems of the district.

But this was only a 'side-line,' the main object being to examine the sections of pre-Carboniferous rocks so well exposed at Wharfe Mill Dam, and in the adjacent bed of the Austwick Beck, which shew a sequence from the Bala or Coniston Limestone series of the Ordovician (or Lower Silurian of the Geological Survey) through the Silurian (or Upper Silurian), to the Carboniferous. An obscure exposure in the dam yielded some interesting fossils, including graptolites (probably the first to be found in this particular bed), *Illænus*, and *Strophomena siluriana.* The rocks are mudstones and volcanic ash. The amount of water running in the beck interfered somewhat with the examination of the higher beds of the series, but several fossils were found, some of such interest as to warrant being sent to the specialists for identification.

Godfrey Bingley.] **Austwick Beck Head.** [*Photo*

A detour was made for a short distance to the north of the beck, for the purpose of inspecting the conglomerate at the base of the Silurian. (The names as used by Prof. Hughes are now used, viz., Ordovician and Silurian). It is here thicker and coarser than anywhere else in the area. The matrix is calcareous, and the included fragments are rolled and angular, of various sizes, derived from the mudstones, grits, and breccias of the Green Slate series. The conglomerate is cut off by a fault, so does not appear in the stream section.

Godfrey Bingley] [*Photo*

Crummack Dale.

Many instructive features were observed on the way up the dale. The variations in elevation of the Silurian rocks were well seen, the beds of hard grit forming the higher points attaining nearly 1200 feet above sea-level, whilst the overlying Carboniferous Limestone fills up the hollows due to the denudation of the softer shales, which near Norber fall to 700 feet. On the slopes of Studrigg the folding of the older rocks was shewn clearly.

A call was made to see the bed of an old lake near Southwaite, in which is a bed of marl made up of the remains of fresh-water shells.

Crummack Beck Head was the next stopping place. Owing to folding and subsequent denudation, the Silurian basement conglomerate is exposed here, and within two or three yards of it is a good section of the Carboniferous basement conglomerate, truly a most interesting spot, but time prevented an adequate study of it.

Passing through the fields into Norber Lane, it was possible to follow the line of the famous Norber boulders, as carried by the Crummack Dale glacier, from their source on the outcrop of the Austwick Grits, where they were spread in great profusion, till they gradually assumed a definite trail, towards the summit of Norber Brow, where the perched blocks, so familiar to all geologists, are left stranded on the limestone. We were not able to visit them, but the conglomerate at the base of the Carboniferous Limestone, under Norber Brow, was examined. It is here a thick deposit, resting upon the edges of the Bala beds. At its base are some very large pebbles, derived from the under-lying rocks. Higher up these gradually get smaller, and the calcareous matrix contains a number of fossil corals of various species, some of which were collected. From the Bala beds exposed in the lane below specimens of some trilobites (*Trinucleus*) were obtained.

This finished the day's work, perhaps as interesting and instructive a one as has ever fallen to the lot of this section of the Union.

But it is impossible to do very much detailed work in a day's excursion. As pointed out by the leader, the object of an excursion of this kind is to see the general features of the geology, and to note the critical beds and sections, so that individuals may go afterwards, straight to the spot, and devote time to detailed work. There is plenty of scope for such work in this area—the identification of the contents of the Silurian and Carboniferous conglomerates, and the working out of the comparatively unknown fauna of the Ordovician and Silurian beds, not to mention other problems. We are indebted to the Yorkshire Geological Society for the loan of the blocks for the accompanying illustrations.

BOTANY.—Mr. Chas. Waterfall reports that at Norber Syke were found *Campanula latifolia* and *Heracleum sphondylium* var. *angustifolium*. Following the beck above the Dam Bridge were noted *Viburnum opulus, Asplenium Ruta-muraria, Polypodium vulgare, Parnassia palustris, Pinguicula vulgaris,* *Primula farinosa* in fruit, *Scirpus compressus, Mollinia varia* and on the moors *Drosera rotundifolia.* The cove-like pasture under Moughton Scars was visited, from which *Polygonum viviparum* is recorded, but no specimens were seen, probably due to the lateness of the season. Here, however, were found *Selaginella selaginoides, Veronica anagallis-aquatica,* etc. On the roadside near Austwick occurred *Rosa villosa,* and in a rough pasture on the edge of the moss *Gentiana amarella* was found. On Austwick moss the following were noted:—*Oxycoccus quadripetala, Vaccinum Myrtillus* in late flower and fruit, *Salix repens* and *S. pentandra* in fruit, *Myrica Gale, Utricularia minor* from a peaty pool, *Andromeda polifolia, Empetrum nigrum* and *Scirpus cæspitosus.*

On Lawkland Moss were seen *Utricularia vulgaris, U. major, Serratula tinctoria, Epilobium palustre, Ranunculus hederaceus, Viola palustris, Veronica scutellata, Erica tetralix,* and one field was noted particularly covered with *Scabiosa succisa.* In addition to the above Mr. Winter recorded *Paris quadrifolia, Hypericum humifusum,* and *Ophioglossum vulgatum.*

MAMMALS.

Albino Brown Rat in Yorkshire.—A specimen (female) of the above was caught at Thicket Priory, West Cottingwith on October 9th. Another female example came to hand from the same locality on November 12th; weight 8 ozs., length of body 7¼″, length with tail included 13½″; both specimens have beautifully white fur and characteristic pink eyes. They are undoubtedly wild rats, and have been watched until full grown by the head keeper on the estate (Mr. Thos. S. Wright). I am retaining one for my private collection; the other is to be placed in the York Museum.—SYDNEY H. SMITH, York.

—: o :—

COLEOPTERA.

***Trichopteryx bovina* Mots. in Yorkshire.**—The minute beetles of the genus *Trichopteryx* are difficult to identify on account of their size, and it frequently happens that specimens remain in our collections for some time, awaiting an opportunity of being satisfactorily determined. In September 1902, I took a *Trichopteryx* on the moor at Brimham Rocks, near Dacre, when the Yorkshire Naturalists' Union visited that locality, which seemed to be *T. bovina* Mots, according to descriptions. In this opinion I have now been confirmed by Mr. H. Britten, of Penrith, who has met with, and knows the species. He very kindly made a careful examination of the insect, which enables me to record another addition to the list of Yorkshire Coleoptera.—M. LAWSON THOMPSON, Saltburn.

HUDLESTONIA SINON BAYLE, FROM THE BLEA WYKE BEDS, YORKSHIRE.

FRANK ELGEE

I HAVE recently obtained a rare Ammonite, *Hudlestonia sinon* Bayle, in unusually good condition, from the Blea Wyke Beds of the Inferior Oolite of the Yorkshire Coast. I found it in the Grey Sands at Blea Wyke Point, and determined the species from Mr. Buckman's figures.* and he confirms the identification, remarking that it is the most perfect specimen he has yet seen. Hitherto published records of *H. sinon* in England appear to have been confined to one fragmentary and poorly-preserved example from the Grey Sands, Blea Wyke, in the collection of Mr. W. H. Hudleston, F.R.S., and this is the one figured by Mr. Buckman. Mr. Sheppard informs me, however, that there are one or two examples in the possession of Hull geologists.

The specimen I obtained is a cast measuring 6½″×5½″, and clearly shows the very characteristic broad, shallow, and but little denticulated lobes of the suture lines, a feature which distinguishes the species from *Grammoceras aalense, Ludwigia murchisonæ*, etc. The specimen is now in the Dorman Memorial Museum, Middlesbrough.

◆

A pretty variety of *Abraxas grossulariata* from Yorkshire is figured in 'The Entomologist' for October. In the same journal *Cerura biscuspis* is recorded for Cheshire.

A writer in a contemporary states that 'science and sentiment, poetry and parliament' have combined to make the British Islands probably the safest place in the world for our feathered friends. 'Science and sentiment' seems perhaps alright, but 'poetry and parliament' don't appear to go well together.

In an article on 'Methods of testing Slate' in the September number of the 'Quarry,' we learn that the presence of clay can be tested by breathing upon a fresh piece of slate, and observing whether there is any argillaceous odour. We heard of this test being applied recently (not by a geologist), and the slate was found to have a distinct odour of whiskey.

Possibly it will not be necessary to say who is the writer of the following notice on Mr. Francis Darwin's presidential address to the British Association : 'A great part of Mr. Darwin's subject is already familiar to my readers . . . . being no more than an elaborate statement in scientific language of a fact upon which I have often insisted, namely, that there is no essential difference between the lowest animals and plants.'

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* Inferior Oolite Ammonites, Pal. Soc. Monog., p. 227, Plate 38, figs 13-16.

NOTES ON CHESHIRE LAND AND FRESH-WATER MOLLUSCA.

J. WILFRID JACKSON.
Manchester Museum.

On looking over my records and specimens, I find the following are additional localities to those given in Mr. Chas. Oldham's papers on 'Cheshire Mollusca' in 'the Naturalist' for July 1908 (pp. 253-261), and 1896 (pp. 109-128).

Zonitoides nitidus (Müll), Northern Etchells (1903); Tom Wood, Broadbottom (1904).

Punctum pygmæum (Drap.), Tom Wood, Broadbottom (1904).

Sphyradium edentulum (Drap.). Tom Wood, Broadbottom (1904).

Hygromia hispida (L.). var. *hispidosa* Mousson, and var. *albida* Jeff. Canal margins, Poynton (1903).

Acanthinula aculeata (Müll.), Tom Wood, Broadbottom (1904).

Vallonia excentrica Sterki. The Marple ('J. of C.', vol. x., p. 335) record for *V. pulchella* should be transferred to this species. *Vallonia excentrica* was not then recognised.

Helicigona arbustorum (L.). Tom Wood, Broadbottom (1904).

Cochlicopa lubrica (Müll.), var. *lubricoides* Fer. Romiley (1902) Var. *hyalina* Jeff. Romiley (1902).

Vertigo substriata (Jeff.). Tom Wood, Broadbottom (1904).

Acroloxus lacustris (L.). Mere Mere (1903).

Planorbis crista (L.). (=*nautileus* L.). Mere Mere (1903).

Planorbis carinatus Müll. Canal at Poynton (1903).

Planorbis fontanus (Lightfoot). Mere Mere (1903); Canal at Poynton (1903); Canal at Dukinfield (1903).

Aplecta hypnorum (L.), Northern Etchells (1903).

Paludestrina jenkinsi Smith. Var. *carinata* Smith. Plentiful in old disused coal-boats on the Peak Forest Canal at Dukinfield.

Valvata piscinalis (Müll.). Canal at Dukinfield (1903).

◆

We regret to see the announcement of the death of Mr. Arthur Lister, F.R.S., well known for his researches in the Mycetozoa.

A paper by Mr. Ruskin Butterfield (Hastings), 'On Sub-species in Ornithology and their Nomenclature' appears in 'Aquila,' Vol. XIV. (Buda Pest).

ANTHROPOLOGY AT THE BRITISH ASSOCIATION.

H. A. AUDEN, D.Sc.

THE opening address, given by the President of the Section, Professor Ridgeway, Disney Professor of Archæology, Cambridge, bears the title 'The Application of Zoological Laws to Man.' The whole paper is an 'attempt to shew that the chief errors which impede the scientific study of man, which lead to the maladministration of alien races, and which beget blunders of the gravest issue in our social legislation, are due in the main, to man's pride in shutting his eyes to the fact that he is controlled by the same laws as the rest of the animal kingdom.' The first point raised was the problem of the stratifications of populations, shewing that the doctrine that identity or similarity of type means identity of race was untenable, since it leaves out of consideration the effects of environment in changing racial types. An example of this change is found in the Boers, who, in less than 150 years, have lost the old Dutch build. The effects of climate upon the natives of the New World are equally patent, starting with the Iroquois of the temperate regions—a tall, light-complexioned race, and passing southwards, their kindred tribes grow darker in complexion, and more feeble in physique (except where they live at high altitudes—a condition which exerts the same influence as latitude) as the equator is approached. Crossing the equator, the reverse is the case, the physique gradually improving, until the vigorous Pampas Indians are reached. The same law can be seen at work in Europe, where the dark race on the shores of the Mediterranean gradually pass northwards into the most light-complexioned race in the world, on the shores of the Baltic. The explanation of the change in pigmentation is not to be found in the movements of the peoples either upwards or downwards from the Alpine or Baltic regions. A complete demonstration of the same doctrine is found in the animal world. The horse family can be followed out with great exactness, and every belt is found to have its own particular type. Characteristics of race, other than pigmentation, such as the skull and other osteological features, lead to the same conclusions, nor does the hypothesis fail when applied to the linguistic tests of racial identities, or the systems of tracing inheritance. The second part of the address emphasised the fact that, owing to the total disregard of natural laws, which modify and dif

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1908 December 1.

ferentiate one race from another, mistakes of the gravest nature are being made in our administration and legislation. In any wise administration of tropical regions it must be a primary object to study the native institutions, to modify, and to elevate them whenever it may be possible, but never to seek to eradicate or supplant them. The final part of the address was concerned with natural laws in relation to our own social legislation. The same principles which are at work in the differentiation of races are at work within each community. It is an unfortunate fact that no statesman, when devising schemes of education or social reform, takes into consideration the doctrine of natural selection, and the survival of the fittest. If the present policy of our legislators is adhered to, the physical standard of the British citizen will deteriorate. ‘Should this unfortunately come to pass, it will be the result of human pride refusing to apply to the human race the laws which inexorably regulate all nature.’

A paper on the Veddas, by Dr. Seligman, who has recently returned from Ceylon, is an important addition to our knowledge of these people. In spite of inter-marriage and borrowings from their Tamil neighbours, both the ‘village’ Veddas and ‘coast’ Veddas still retain much of the clan organisation of the less contaminated ‘rock’ or ‘jungle’ Veddas. Their regard for the dead excepted, the psychical life of the Veddas is very limited. Although decorative art and personal ornament are very crude, the cult of the worship of the spirits of the departed has given rise to pantomimic dances, mostly accompanied by offerings to the dead, and the use of a ceremonial arrow—an indispensable feature of many of these dances. The language of the Veddas is Singalese, but they possess a few words which are not obviously Singalese.

In ‘The History of Mummification in Egypt,’ Prof. G. Elliot Smith shewed that the pre-historic Egyptians were familiar with the natural mummification or rather desiccation brought about by the dryness of the soil. The idea of securing by art the preservation of their dead, which was no longer attained naturally when coffin or rock tomb burial became the custom, probably arose in early dynastic times. The practice of embalming was almost certainly not introduced into Egypt from other lands. There is some evidence of mummification in the times of the earliest Pyramid builders, but the earliest bodies certainly known to have been embalmed are those of the tenth dynasty period from Sakkara. By the time of the Middle Empire, the technique of the operation had attained the stage which was the conventional procedure for the succeeding two thousand years ; the highest development was reached in the time of the New Empire, when elaborate measures were taken for restoring the body to a greater semblance to the form which it had had in life. Further stages in the evolution of embalming were followed by a rapid decline.

A second paper—'Anthropological Work in Egypt,' demonstrated that on comparing the earliest known human remains with those of later times, it was evident that in pre-dynastic times, Egypt and Nubia were inhabited by one and the same race, which has persisted with little or no change up to the present day. There is some slight evidence of a small amount of infusion of negro blood, which was probably a negligible factor in early pre-dynastic times, but becoming more pronounced in later and especially so in modern times. The people of Nubia from the time of the earliest Egyptian dynasties, became transformed by negro infusions into a hybrid race.

In Mr. W. Crooke's paper—'Rajputs and Mahrattas'—it was shewn that there was no historic justification for the assumed Sycthian or Hun entry into the Deccan. It was suggested that the influence of environment and sexual selection probably explained the uniformity which characterises the physical character of the people of the Punjab.

Mr. C. T. Currelly's paper was an attempt to arrange in correct sequence, the stone implements of Egypt by the degree of patination found upon them. An examination of several thousand pieces shewed that form and patination go together, and that each type of implement has definite limits of patination.

An account of a collection of laws of the Dinkas of the Egyptian Soudan was given by Mr. E. Sidney Hartland. This pastoral people have a patriarchal government, and now reckon descent in the male line only. Some details of their customs were given, amongst others, a probably unique legal fiction by which an heir is provided when the male line has died out.

The Rev. W. A. Adams gave a description of the stone implements found at the following five sites in South Africa :—Bosman's Crossing, Stellenbosch, the Karoo and the Vaal River Terraces, near Kimberley, Bulawayo, the Victoria Falls.

'Pre-historic Archæology in Japan,' by Mr. N. Gordon Munro, gave some general conclusions which recent observation has made possible. No undoubted palæolithic remains have been found, but a large number of neolithic sites have been explored.

A valuable contribution to the 'Early History of the Irish Horse' was made by Dr. R. F. Scharff. The available evidence supports the view that the resemblance of the modern Connemara pony and the Libyan race of horse is not entirely due to human introduction of foreign stock, but to the fact that the wild horse of Ireland possessed the same characteristics as the latter, and transmitted them to the existing ancient domestci breeds.

Dr. T. Ashby's papers included an account of the explorations at Cærwent from August 1907. The chief features exposed were a large drain and the remains of private houses. The examination of a rubbish pit yielded a rudely-carved statuette of a female deity, probably British workmanship. Irish Archæology was represented by a group of papers, the significance of which is evident from their titles :—Mr. G. Coffey —'The distribution of gold Lunulæ'; 'The Survival of La Téne Ornament in Penannular Celtic Brooches'; 'Note on the Tara Brooch'; Mr. Armstrong's 'Leather Shield found in Co. Longford,'; Mr. Hewson's exhibit of a La Téne spearhead; and Mr. Orpen's contribution to the controversy concerning the Origin of Irish Motes. The results of recent excavations in Greece were embodied in two papers, the first being the report of the third season's work at the Sanctuary of Artemis Orthia at Sparta. The remains of the primitive temple, the earliest Dorian style, contemporary with the archaic altar, were exposed. The suggestion that the so-called Cyrenaic pottery is really Laconian has been fully confirmed. Remarkably rich finds of late 6th or early 5th century terra cotta masks, and the carved ivories, belonging to the periods when the primitive building was still standing, have been made.

In the second paper—'Neolithic Culture in N. Greece,' Mr. J. Droop brings forward evidence that the North of Greece was still in the Stone Age during the development of the Aegean bronze culture.

'The Sculptured Stones of Norway,' by Dr. Haakon Schetelig, gives proof of the existence of direct communication between Scotland and Western Norway about A.D. 700. The smybols, such as the comb, the serpent, the group of four concentric circles, the crescent and the radiated sun-disc, frequently occur on stones, both from Norway and Scotland. Prof. S.

Bügge was led to the same conclusion bygcertain peculiarities in the form of the Runes, and Mr. Jacobsen, by a consideration of the Norwegian place names in Shetland. Of particular interest is a stone from Tu, in Jæderen, runes and probably the figures show the peculiar characteristics of and may have been influenced by the sculptures of the Isle of Man. Attention was drawn to the much-discussed question of archaic 'Cup and Ring Markings,' by the Rev. H. J. Dunkinfield Astley. Various theories have been advanced as to the origin and meaning of these widely-distributed markings. The suggestion that they were connected with totemism, being analogous to the designs on the 'churinga' of the Arunta did not meet with support in the discussion which followed.

Miss Layard, whose excellent work upon a Palæolithic site and Anglo-Saxon cemetery near Ipswich will be recalled by many, has again been fortunate in discovering 'An ancient land surface in a river terrace at Ipswich, and a palæolithic site in the Valley of the Lark.' A remarkable find was a 'core' of such excellent workmanship, that it suggested that the 'core' was the aim and intention of the worker rather than the flakes struck off.

A large number of reports were laid before the Section, but owing to the number of papers, they were in almost all cases taken as read. Of these, we single out for mention—'The Report of the Committee to report on the best means of registering and classifying systematically Megalithic remains in the British Isles,' owing to the fact that, although official commissions have been recently appointed to report on the historic monuments of Scotland and Wales, neither England nor Ireland is as yet provided with any official commission of this kind. It is impossible to over-emphasise the serious risk to Megalithic monuments—one of our most valuable natural heritages, which results from the present utterly inadequate provisions and ineffective working of the 'Ancient Monuments' Act.

Finally, mention should be made of the interesting excursion to the tumuli of Newgrange and Dowth, taking Monasterboice with its Celtic crosses en route.

Throughout the whole meeting there was evidence on all sides of the care bestowed on the arrangements by all the workers, and to this, together with the proverbial Hibernian hospitality experienced by the visitors, the great success of the Dublin Meeting is due.

1908 December 1.

ZOOLOGY AT THE BRITISH ASSOCIATION.

Prof. G. H. CARPENTER.

The zoologists of the Association were admirably housed in the Royal College of Surgeons, Professor Alex. Fraser acting as local secretary, and making excellent arrangements. Dr. S. F. Harmer, F.R.S., of Cambridge, was President of the Section.

In his address, Dr. Harmer dealt particularly with the morphology and variability of the Polyzoa, a group in which, as he reminded the Section, an Irish zoologist, J. Vaughan Thompson, was the pioneer student, and G. J. Allman, another Irish naturalist, author of the ‘ classical monograph.’ Dr. Harmer's own researches on the Polyzoa are known to all zoologists. In a lucid and comprehensive survey of the Polyzoan ’ colony,’ he discussed the function of the curiously modified individuals known as ‘ avicularia,’ supporting the view that, ‘ like the pedicellariae of Echinoderms, they are defensive organs,’ and that there services are valuable against ‘ encrusting organisms, including other species of Polyzoa ; . . indeed, the enemies against which a polyzoon has to provide are probably in a special degree the members of its own class.’ Attention was called to the extreme variability of the avicularia among the Polyzoa, and the difficulties raised by this variability. ‘What conclusions can we draw from the association in one and the same colony of the vicarious type of avicularium with adventitious avicularia of the most specialized description ? How can we explain the fact that each kind of avicularium occurs in certain species, but not in all the species, of many distinct and not specially related genera ? And lastly, what is the significance of the fact that certain species of a genus which is normally provided with avicularia may be totally destitute of these organs ? ’ It is not surprising that Dr. Harmer, meditating on these problems in the Cambridge of the twentieth century, suggests ‘ that some of our difficulties might be removed by appealing to the results obtained by workers on Mendelian inheritance . . . that the perplexing occurrence of vicarious avicularia in some of the colonies of certain species may be interpreted as a reversion due to the combination of two or more allelomorphs that may not have occurred together in the parental forms.’

The meetings of Section D were, on the whole, of very great interest. Perhaps the most striking feature was a joint discussion with Section K on the ‘ Determination of Sex,’ on Monday, 7th September, opened by Mr. L. Doncaster, and continued by Miss N. M. Stevens, Mr. W. Heape, F.R.S., and Professor W. Bateson, F.R.S. Mr. Doncaster, from breeding experiments with the common Magpie Moth (*Abraxas grossulariata*), and its variety *lacticolor*, concludes that 'sex determinants behave as Mendelian characters, maleness and femaleness being allelomorphic with one another, and femaleness dominant. All females are heterozygotes, carrying recessive maleness, and producing male-bearing and female-bearing eggs in equal numbers; all males are homozygotes, carrying only maleness, and producing only male-bearing spermatozoa.' This theory was supported by the remarkable researches detailed by Miss Stevens, through which Professor E. B. Wilson, herself, and other American cytologists have demonstrated the presence of an odd number of chromosomes (one less than the normal number) in some spermatozoa of certain species of insects, these spermatoza apparently fertilising female-bearing eggs, those with the full number male-bearing eggs. Professor Bateson also supported the theory from breeding experiments with Canary Finches. Mr. Heape, on the other hand, gave reasons—derived for the most part from human birth-statistics—in support of somatic influence on the determination of sex.

Evolutionary problems of an older and simpler type were raised on Thursday, 3rd, by Professor Poulton, Dr. F. A. Dixey, and Mr. J. C. Moulton, who exhibited and discussed series of butterflies, illustrating 'convergent mimicry' of distasteful forms. Embryologists were well pleased to welcome Professor A. W. Hubrecht as a vice-president; he took the chair on Monday afternoon, September 7th, when Professor J. P. Hill described the 'Segmentation of the Marsupial Ovum,' and Professor E. W. MacBride 'Gastrulation in Amphioxus.' These two authors defended respectively the ancestral value of the monotreme yolked egg, and the ectodermal nature of all the inpushed cells in the Amphioxus gastrula. Both of these familiar positions were genially attacked by the great Dutch embryologist. Later in the same afternoon, Dr. A. Smith Woodward, F.R.S., of the British Museum, delighted the Section with a lecture on the 'Evolution of Fishes.' On Friday afternoon (4th Sept.), Prof. Cossar Ewart lectured on the 'Wild Ancestors of the Domestic Horse,'

Geographical zoology was represented by Dr. W. A. Cunnington, who described his recent expedition to Lake Qurun, in Upper Egypt; noteworthy results were a fresh-water gymnolaematous polyzoon and a fresh-water medusa with its hydroid. Professor W. A. Herdman contributed 'Notes on a recent visit to the Ceylon Pearl Bank,' and Professor G. H. Carpenter gave an account of newly-discovered Arctic and Antarctic Collembola.

On Tuesday, September 8th, the Section held a joint meeting with I (Physiology) to consider the biological and pathological relations of blood parasites, especially Trypanosomes. Mr. R. Newstead contributed an account of the Bionomics of Tsetse flies, while Messrs. J. E. S. Moore and A. Breinl described some newly-discovered features in the life history of the Trypanosoma of sleeping sickness. When the flagellate parasites disappear from the blood, they are present as small, non-flagellate cells in the spleen and marrow. Drs. Breinl and Hindle gave a paper on the life history of *Piroplasma camis.* Besides the ordinary amoeboid and 'twinned' forms in blood corpuscles, they detected two flagellate forms—one round, the other oval, in the plasma of the vertebrate host. But they had no results as to the life-cycle in the tick.

The burning question of Nomenclature was brought before the Section by Mr. G. A. Boulenger, F.R.S., of the British Museum. He protested against those upholders of the 'law of priority' who supplant well-known names used in classical treatises, and a resolution against such changes was carried unanimously.

The Section did not meet for business on Saturday, 5th September, but a party of seventy paid an early visit to the Zoological Gardens in Phœnix Park, where the Council of the Royal Zoological Society entertained them at breakfast in the Haughton House. This gathering was generally admitted to have been very enjoyable, and much interest was afterwards displayed in the fine set of animals on view, especially the three Chimpanzees at present in the Anthropoid House, two well-grown litters of Lion-cubs, and the Pacific Sea Lions and Irish Grey Seals in their new pond. In the afternoon, by kind invitation of Rev. W. S. Green, a party of zoologists travelled to Kingstown, and boarded the new fisheries cruiser 'Helga.' The vessel steamed out towards Lambay, and practical demonstration of the admirable gear and apparatus for collecting and preserving marine specimens was given.

GEOLOGY AT THE BRITISH ASSOCIATION.

J. LOMAS, F.G.S.

THE British Association receives a warm welcome whenever it holds its brief autumnal Session, and Dublin was not behind other places in extending abundant hospitality to those who were able to attend the meeting.

Section C has special reason to remember the admirable arrangements made for the comfort of members, and under the guidance of Mr. H. J. Seymour and others, a charming series of excursions was organised, which enabled us to become acquainted with the salient geological features of the neighbourhood.

Professor G. A. Cole contributed largely towards this end in the interesting lecture he gave immediately after the President's Address. Other papers on Irish Geology were contributed by Messrs. R. J. Ussher, H. J. Seymour, E. T. Newton, Dr. Scharff, Mr. H. Bolton, the President, and others.

A paper on the Castlepook Cave, near Doneraile, had for its purpose a discussion of the Age of the Cave, from data gathered from the organic remains entombed, and the physical features it displays.

The conclusion arrived at favours it being of pre-glacial age, and this corresponds with the general opinion regarding the examples we have in Yorkshire, and other parts of the north of England.

Another paper on Irish Geology by Prof. Cole, dealt with the former extension of the Cretaceous rocks to the west of County Kerry. The occurrence of Miliolite Limestone and other rocks in the material brought by the dredge from the sea bottom, leads to the opinion that these are derived from rocks *in situ*, and forming the floor of the oceanic platform.

The igneous rocks and associated sedimentary rocks of Co. Mayo and Co. Galway were described by Prof. S. H. Reynolds and Messrs. Gardiner, Muff and Carruthers.

The President's Address on the Geological effects of Radium was one of the most brilliant which ever proceeded from the Chair of Section C, and promises to mark an epoch in our conceptions of the structure of the earth, and the forces at work in its interior.

The Microscopical Structure of the Derbyshire Limestones was discussed by Dr. H. H. Bemrose, in a paper which dealt very fully with their petrographical characters. Numerous photographs were thrown on the screen, illustrating the structures found in the Mountain Limestone, Metamorphic Limestones, and Metasomatic varieties. Of special interest were series showing the gradual transitions from a pure limestone, through limestone with quartz crystals, quartzose limestone, to quartz rock, and others exhibiting changes from pure limestones to dolomites and quartzose dolomites.

Mr. H. Brodrick described the occurrence of Cave Pearls in certain limestone caves in Derbyshire and Ireland, and also announced the discovery of Reptilian footprints from the Oolitic rocks near Whitby.

Professor W. M. Davis traced the steps by which Snowdonia has assumed its present form, and suggested that the occurrence of cwms, blunted spurs and over-deepened valleys were, in large measure, due to glacial erosion.

Dr. Tempest Anderson exhibited a beautiful series of photographs, showing the changes in the Soufriére of St. Vincent since the great eruption of 1902.

Perhaps the culminating point of interest was reached during the discussion on Mountain Building. The President opened the proceedings by enunciating a new theory of liquid or viscous horsts. He showed that rocks in a deep synclinal fold must exist in this condition, and the effects of recumbent folds could well be produced by great forces acting on liquid masses existing below the surfaces.

Sir Archibald Giekie, following the President, referred to the two main types of mountain structure ; chains like the Alps, which are plications of the terrestrial crust, and upraised plateaus having an approximately horizontal arrangement of their constituent rocks.

On general principles, he stated that we were still wanting means of deciding whether plications were rapid or slow, or whether they were still going on. He suggested that delicate geodetic observations might settle these questions.

Prof. C. Lapworth gave a general resumé of Earth folding as a whole, and dealt specially with the harmonic relationships which mountain chains exhibit.

Prof. W. J. Sollas referred to the work of Prof. Lugeon in the Swiss pre-Alps as affording support to the President's theory, and showed that viscous material might be transferred during folding from one district to another. He suggested that the lavas of the North of England and Scotland might have originated under the Alps, and were carried to our Islands during the uplift of the Alpine chain.

Prof. Cole remarked that earlier geologists, such as Scrope, recognised recumbent folds, and attributed their formation to vertical upthrust of igneous cores and the slipping away of sediments. He asked whether the epochs of mountain building might not be due to some primordial periodic change of temperature in the interior, remaining from the time when our planet formed part of what we call a variable star.

BOTANY AT THE BRITISH ASSOCIATION.

T. W. WOODHEAD, Ph.D., F.L.S.

As was anticipated, the president (Dr. F. F. Blackman) naturally gave the section a strong physiological bias. His opening address dealt with ' The Manifestations of the Principles of Chemical Mechanics in the Living Plant," and was followed by numerous papers by the president and his students, which made a brave show, and one could not help being impressed with the great activity that is going on in the Botany School of Cambridge. The contributions of chief interest to field naturalists, however, were by Mr. A. G. Tansley and Dr. Moss on the Woodlands of England. These were illustrated by vegetation and geological maps of parts of south east England and Derbyshire, now under investigation by the authors. Though the major paper was by Mr. Tansley, they both brought out the same general principles. An examination of the woodlands of the country, with a view to grouping them in a natural way, shewed that there remained very little (1) primitive woodland, but areas existed which may be called (2) natural woodland, where, though felling had occurred, they had been rejuvenated by self-seeding of the former species. A more frequent type was (3) woodland planted up with the type of tree natural to the area. Often areas are (4) planted up with original species, with an admixture of others as Sycamore among Oak. Other types are (5) woods felled and planted up by new types, as Oak replaced by Larch, and lastly (6), plantations *de novo*, such as woods on pasture lands, with a ground flora not characteristic of typical woodland.

A very suggestive table was given, in which the woods were arranged in two series :—(1) Calcareous, (2) Silicious. In the low ground occurred the Alder and Willow thicket, then the Damp Oak Wood on clays, with *Quercus pedunculata* as the characteristic tree. From this, along the line of the Silicious series, came the Dry Oak Wood on light loamy and fine sandstone soils, and the Oak-hazel Coppice ; the Oak-birch-heath type on coarse sands and shallow, non-calcareous soils. Beech woods on shallow sandy soils, and Pine Woods naturally spreading ; the three remaining types recognised in this series are Oak Woods on shallow soils, with *Quercus sessiliflora* as the characteristic tree, Birch-oak Woods and Birch Woods.

On the Calcareous side were the Damp Oak Woods on Marls, and Oak-hazel Coppice ; the Ash-oak Woods, a transition type on Calcareous sandstones, etc. Ash Woods on Limestones, and Beech Woods on Chalk. The reading of the paper was followed by an interesting discussion. Among other papers, the one by Prof. Yapp on 'Evaporation in Relation to the Stratification of Marsh Vegetation," shewed that a valuable series of careful observations is going on in connection with his studies of the vegetation of Wicken Fen.

The new botanical laboratories proved an ideal meeting place, and Prof. Dixon spared no pains to make the visit a success, while too much praise cannot be given to Mr. R. Lloyd Praeger and his colleagues, for the admirable arrangements they made for the excursions.

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Hull Museum Publication No. 55, being the 26th quarterly record of additions, contains an illustrated list of over 130 old Staffordshire figures, an illustration and description of a rare Roman vase from Brough, and some pre-historic remains from Middleton-on-the-Wolds (with plate). There is a paper on 'Hull and District 150 years ago,' and numerous shorter notes. It is sold by A. Brown & Sons, Hull, at one penny.

The **Annual Report and Transactions,** 1907, of the **Manchester Microscopical Society** (published 1908) is to hand. It contains the Presidential Address of Professor S. J. Hickson, F.R.S., on 'The Physical Basis of Hereditary Characters.' There are also papers on 'Mimicry in Nature,' by H. G. Willis ; 'A few notes on the Heterokontæ,' by C. Turner ; 'Notes on the Development of the Male Fern,' by A. P. Bradshaw ; 'On the occurrence of wool-like hairs on the cow,' by J. E. Lord ; 'The Polyzoa—their place in Nature, with notes on some peculiarities in structure,' by J. Smith ; 'Destruction of Oak and Greenheart Timber by "Sea Worms" ' by J. Eastwood ; and a good paper on 'House Flies,' by C. G. Hewitt. There are some plates, and the volume is very cheap at eighteenpence.

HUMBLE BEES AT WEST AYTON, YORKS.

REV. W. C. HEY, M.A.

DURING the past season, I have been collecting and studying the Humble Bees, which occur within four miles of West Ayton, near Scarborough. These Bees belong to the two genera *Bombus* and *Psithyrus*. The latter is a 'cuckoo' genus, parasitic on *Bombus*. Consequently there are only males and females in *Psithyrus*, no workers being required as in the case of *Bombus*. I have been assisted greatly in collecting by Mr. C. H. Laycock, of Newton Abbot, and in identifying species, by Mr. Saunders, of Woking, the well-known Hymenopterist. The records are consequently absolutely trustworthy :—

BOMBUS SMITHIANUS White.

The discovery of this rare and beautiful golden-haired bee was a surprize. I took a specimen in August on *Carduus lanceolatus* in the wild 'carrs,' two miles south of West Ayton. Mr. Laycock also got two specimens there, and a third in a clover field. We got males and workers, but no queens.

B. AGRORUM Fab.

The common wholly tawny humble bee swarms everywhere all through the summer. It varies much in colour. The abdomen of the male is sometimes black. We found nests in Forge Valley.

BOMBUS LATREILLELLUS Fab.

The type form does not seem to occur here, but the rare variety *distinguendus* Mor., is plentiful. The queens occurred in Yedmandale, in May, on *Orchis mascula,* with bunches of the pollinia on their heads. Later in the year we took many workers and males, generally on *Carduus lanceolatus*. They were particularly abundant in the upland lanes that led to the moors.

BOMBUS HORTORUM Linn.

A most abundant species, distinguished by the extraordinary length of the tongue, which enables it to reach the honey in leguminous flowers, and other very long-tubed blossoms. It varies in size perhaps more than any other species.

var. SUBTERRANEUS.

A gigantic dark-coloured form of *hortorum,* which was common in my garden.

var. HARRISELLUS Kirb.

A coal black form. Mr. Laycock took it at Hutton Buscel. I took it in my garden, and on the Carrs.

BOMBUS PRATORUM Linn.

This gaily-banded bee was very abundant on raspberry flowers, and on bramble flowers on Seamer moors.

BOMBUS SYLVARUM Linn.

This species is not plentiful, and we only took it at West Ayton, on the slope of the hill where the ruined castle stands.

BOMBUS SOROENSIS Fab.

A rare species which is very plentiful at West Ayton. We took a number on a large patch of *Campanula glomerata* in my garden, and it abounded in the field paths that led from East Ayton to Seamer moor.

BOMBUS LAPIDARIUS Linn.

This is the large red-tailed humble bee. The queens were moderately plentiful on lupins in May. In August, the workers and males swarmed on knapweed about Forge Valley. The male is quite unlike the female or worker, and wears a broad golden band on the thorax.

BOMBUS TERRESTRIS Linn.

This is *the* Bumble-bee, par excellence, whose heavy, rather awkward antics among the flowers are so entertaining. A very common species wherever there are flowers. The darker variety, *virginalis* Kirb, is equally common.

PSITHYRUS RUPESTRIS Fab.

Parasitic on *Bombus lapidarius*, and similarly coloured. We only took one female (at East Ayton), easily distinguished by the black wings. The males were common near Seamer moor on knapweed at the end of August.

PSITHYRUS VESTALIS Fourc.

We only met with this species in the Carrs, where it occurred exclusively on the flowers of the Ragwort, in August.

var. AMŒNUS.

This variety Mr. Saunders says he has never seen before, and characterizes as a 'most interesting discovery.' We took two specimens on the Carrs. It seems to be new to Britain.

Psithyrus barbutellus Kirb.

This large species is fairly common in gardens at West Ayton.

Psithyrus campestris Panz.

We never saw this species till quite the end of August, when a large number of males suddenly appeared on the masses of knapweed that line the lane sides that lead to Seamer moor. A black variety occurred with the normal form. In September, I found one female in Forge Valley.

Psithyrus quadricolor Lep.

Not uncommon in gardens at West Ayton.

The above list includes all the five British species of *Psithyrus*, and nine out of the sixteen species of *Bombi*—a remarkable result for a few months' desultory collecting within a radius of four miles.

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A party of five Glossy Ibises visited the Northumberland coast at the end of August ('Zoologist,' October).

Mr. W. Saville-Kent, well known for his excellent work on the Great Barrier Reef of Australia, died at Bournemouth on October 11th.

Lord Rayleigh has intimated his wish to be relieved of his duties as President of the Royal Society, and the Council has decided to nominate Sir Archibald Geikie, K.C.B., D.C.L., as his successor.

Amongst the birthday honours we were glad to notice that Knighthoods had been conferred upon Dr. N. Bodington of the Leeds University, and Dr. Jonathan Hutchinson, the President of the Museums' Association.

Messrs. E. and J. H. Howarth inform us that the Adwick shap boulder referred to on p. 424, is now in the Sheffield Museum, and not at Barnsley. Mr. Bayford, of course, was fully aware of this, and is not responsible for the error.

Mr. Thomas Southwell contributes some Notes on an Eighteenth Century Museum at Great Yarmouth, 'Museum Boulterianum,' to the Museums' Journal for October. Of one museum, Mr. Southwell quotes a contemporary 'metrical advertisement,' which gives an idea of the scope of the collection:—

'Monsters of all sorts here are seen;
  Strange things in Nature as they grow so;
Some relics of the Sheba Queen,
  And fragments of the famed Bob Cruso.'

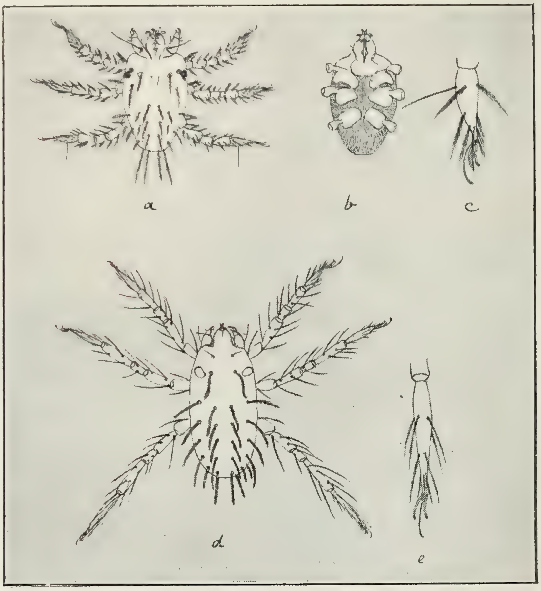
At the annual meeting of the Yorkshire Geological Society, held at Doncaster on November 13th, the Chairman, Mr. J. H. Howarth, referred to the remarkable fact that although the Society had existed 71 years, it had only had two presidents during the whole of that period. The first was Earl Fitzwilliam, who was elected president when the Society was first formed, and occupied the position until his death in 1857. The Marquis of Ripon was then elected president, and has occupied the office ever since, being elected to the post for the 51st time at the Doncaster meeting.

SOME BRITISH EARTHMITES.

Trombidiidae (*Continued from page 377*).

C. F. GEORGE,
Kirton-in-Lindsey.

Trombidium bicolor (Hermann). This is a rather small Trombidium. Hermann says it is six times less than *fuliginosum*. Its body, when found alive is dark coloured, and both Hermann and Koch, in their coloured figures, make it blue-black. I find, however, that the dark colour is caused by the contents of the abdomen, and when this is squeezed out the mite is reddish, rather darker than the colour of the legs; these coloured figures are, therefore, rather misleading. Hermann says it is rare, but I have found it in damp moss, especially in that taken from ditches. Its body is in shape not unlike *fuliginosum*, being longer than broad, widest at the shoulders, rather nipped in at the sides, and rounded posteriorly. The hairs or papillæ are



a. **Larva of *Trombidium holosericeum*** (dorsal surface).
b. ,, ,, ,, (ventral surface, shewing epimeral plates).
c. ,, ,, ,, (last segment of 4th leg).
Three claws; centre one larger; conspicuous spine on 4th segment.
d. **Larva of *Trombidium fuliginosum*** (dorsal surface).
e. ,, ,, ,, (last segment of 4th leg).
Drawn on same scale as *T. holosericeum.*

rather short, close together, slightly curved, and pointing backwards, and are quite simple, without barbs or branches, differing greatly from those already described. I think it likely that further research may discover other species of Trombidium with simple spines, and this fact alone must not be considered specifically diagnostic of *bicolor*. This mite has also a peculiar crista figured by Professor Sig Thor, in his pamphlet under the name of *T. filipes*, which he considers to be the same as *T. bicolor*.

Trombidium holosericeum; larva. One of the female mites found in May was kept in a glass tube with a small piece of moistened blotting paper. This mite laid a globular bundle of smooth, round, red eggs. I removed the mite which was still alive, hoping that the eggs would hatch. Time passed on and I began to fear that I should be disappointed. However, on July 30th, nearly three months after finding the mite, I was delighted to find that the eggs had hatched, and numbers of the larvæ were alive and active. They were very small, and of a bright, red, blood colour; could run about nimbly on glass backwards and forwards, apparently with equal ease; did not fall when the glass was turned upside down; and reminded me forcibly of the larvæ of the Water Mite *Eylais*. They were rather coffin-shaped, and there was an appearance of segmentation dividing the body into three portions. At the posterior end, which was the narrowest, were four remarkably long, straight and sharply-pointed bristles, strongly barbed, other shorter barbed hairs were arranged in pairs on the body. Viewed from above, when alive and without pressure, the palpi were not perceptible, being carried underneath the cephalothorax. In Mr. Soar's figure slight pressure has caused the palpi to become visible. On the last segment of the legs may be found a long tenent hair not barbed (see figure C). I do not know if this larva has ever before been figured. Some of the larva were kept alive until August 28th, and I did not observe much change in their appearance.

Trombidium fuliginosum; larva. I have also had the good fortune to have eggs laid by one of my female specimens of *fuliginosum* and from these have obtained living larvæ of that mite. Mr. Soar has made a very characteristic drawing (D), the little creature appears to be somewhat larger than that of *holosericeum*; it is more of an elongated oval, and the hairs are slightly curved, and although they really end in a point, this is so short as to make them appear rather clubbed. They are also thickly and finely barbed (see figure D). The legs are also rather long, and the internodes cylindrical. In colour it is a yellowish red, and much paler than *holosericeum.* Under the microscope the two species are sufficiently distinct, and also appear to be distinct from the larva figured in my first paper, which is doubtless that of another species of *Trombidium*—not yet identified.

MARINE ZOOLOGY,

Zoophytes in the Humber.—The muddy nature of the Humber no doubt deters many from searching for the interesting and beautiful forms of life known as Zoophytes. In the search for these objects in the Humber, one must be prepared to bring away often more mud, etc., upon one's clothes than is desirable. I have taken the following species on the dates named. On August 25th, in the St. Andrew's Dock Extension, and along the under side of the lowest whaling-piece which runs horizontally along the wooden quay (the water in the dock being low to meet the level of the next neap tide), I noticed tufts of muddy objects. I secured one, and on arrival home, found it to be *Obelia dichotoma,* and parasitic upon it were numerous colonies of stalked animalculæ, also *Bacillaria paradoxa* (diatoms), with its puzzling unceasing motion. On August 26th, I obtained the following additional species of polyzoa, *Membranipora membranacea, Bowerbankia gracillima,* and *Pedicellina gracilis.* On October 1st, I took a shoot of *Obelia,* a fine, large specimen, every bell displaying its flower-like polypite, and crawling upon the colony were several young specimens (I counted nine), of a species of the Nudibranchiata or naked gilled slugs. In two days they had completely stripped it of all its animal tissues. October 9th at Hessle, directly opposite the Beacon, at dead low water, I obtained at the roots of *Fucus,* a small stunted specimen of *Sertularia operculata,* and a single *dead* shoot of *Sertularia argentea.* In conclusion, I should like to inform all lovers of pond and rockpools, that they will find many other forms of life to interest them in our docks. For rockpool and sea-shore hunting, dead low water spring tides are the best, whereas for the docks, the rule is reversed. One or two hours before level water lowest neap tides is the best time, because all stone and woodwork which is covered at all other tides, become bared.—J. THOMPSON, Hull.

In Memoriam.

MATTHEW BAILEY.

In the death of Matthew Bailey, the well-known naturalist of Flamborough, we lose one of the band of keen observers on the East coast, of which the late John Cordeaux was for so many years the pivot and exponent; and it is largely owing to the presence on the spot of so competent an observer, among others, as Matthew Bailey, that Cordeaux's classic work on the birds of the Humber district owes much of its value as a record of facts and observations. Throughout that work, Mr. Bailey's name occurs frequently, in addition to a special acknowledgment in the preface.

Matthew Bailey

But Mr. Bailey wrote much himself on the subject. Very numerous notes from his pen kept the readers of 'The Naturalist' informed of the occurrences of rare birds, and the movements of others for a long series of years. Marine mammals and fishes also were duly noted, and he was ever ready to give of his abounding stores of information to visitors.

The Rev. Robert Fisher's 'Handbook to Flamborough Village and Headland,' published in 1894, contains a particularly useful chapter on the birds by Mr. Bailey.

He was a member of the Yorkshire Naturalists' Union, elected in 1895.

In private life he was a cheery, pleasant, bluff man, a tailor by trade, the owner of property in Flamborough, and at one time a member of the life-boat crew.

He died on the 20th September, 1908, at the age of seventy-three, and three days later was laid to rest, leaving daughters behind him to mourn his loss. R.

BIRD NOTES FROM THE OLDHAM DISTRICT.

F. STUBBS.

On August 31st, about midnight, a policeman picked up a Manx Shearwater in an Oldham street. It was dead when found, but was in first-rate bodily condition, and I was totally unable to find the slightest trace of exterior or interior injury. On September 26th Mr. Jos. Middleton, of Broadbottom, sent me for identification a large hawk, shot that morning by a keeper, who saw it 'hovering over a pheasant.' It was an immature Honey Buzzard, with bright yellow cere, and dark brown irides. The gizzard proved to be full of wasp grubs. The same afternoon a man shot in a suburb of Oldham an immature Buffon's Skua, an addition to our long list of local birds. I may add these observations on this specimen:—Length, 1′ 4″; wing, 1′ 0″; tail, 6″; outer feathers, 5″; culmen, 1″. Bill dark lead-grey, and irides very dark brown; tarsi and proximal third of toes blue-grey, and apices of webs buffish-white; the anterior two-thirds of toes, and webs jet-black. The upper surfaces of the shafts of all but the first two primaries were dark, and the under surfaces white. Its gizzard contained the remains of many insects, amongst which I recognised crane-flies, and the wings of some species of Syrphidæ.

Several observers have recorded the occurrence of the Manx

Shearwater in many inland localities this autumn, and notes on a lesser number of Honey Buzzards have been published. All these, together with the Buffon's Skua—also a bird with a gipsy reputation—are doubtless stragglers from the army of migrants that, each spring and autumn, passes unthought of far above our heads.

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BOVISTELLA PALUDOSA LÉV.

A Puffball new to Britain.

T. GIBBS,
Wirksworth.

The Puffball collected on the moors at the Osmotherley excursion and referred to in the 'Naturalist,' November 1908, p. 409, has turned out to be a find of quite unusual interest. Mr. Carleton Rea, to whom I sent the specimens, forwarded them to Mr. C. G. Lloyd, of Cincinnati, U.S.A., and that authority has pronounced them to be *Bovistella paludosa* Lév. Only one previous gathering of the species in known, that made by Léveillé at Malesherbes, France, in 1845 ; of this gathering, two specimens are in the Museum at Paris, and one at Kew. The habitat of the plant appears to be among Sphagnum on moors, and its apparent rarity may arise from the fact that moorlands are little frequented by mycologists. The specimens in this case were found by a member of the 'general naturalists' party at the excursion.

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FIELD NOTES.

BIRDS.

Abnormal Nesting of the Wood-Pigeon.—On September 12th, 1908, at Great Cowden, in Holderness, whilst walking along the shore under the cliffs, I shot a Wood Pigeon which had flown out of a hole in the sandy face of the cliff, about four feet from the top. On picking up the bird, I noticed that the beak showed signs of feeding young, and also that the front of the hole was well marked with 'white-wash.' So I climbed up to investigate. On inserting my hand, I was astonished to find a fine young Wood Pigeon, nearly full grown, and three warm eggs. There is absolutely no doubt as to the species, as I know the Stock-dove and the Rock-dove.—J. Anderton, Bradford.

FLOWERING PLANTS.

***Polemonium cæruleum* in Bishopdale, Yorks.**—This plant grows in fair quantity on the limestone scars at the head of Bishopdale. The situation is similar to the Grassington, Arncliffe, and Malham stations, and there is no doubt that it is indigenous here. In the new edition of the 'North Yorkshire Flora,' *P. cæruleum* is only included as an alien, an escape from cultivation ; this will therefore be an addition to the number of true native plants in that area.—CHRIS. A. CHEETHAM

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ORTHOPTERA.

Exotic Cockroaches in Louth.—During the Banana season various creatures are found amongst the fruit, many of them alive. Amongst those brought to me were four species of Cockroaches, which have been kindly identified for me by Mr. R. Shelford, as follows :—*Epilampra grisea* de Geer ; *Panchlora nivea* Linn. ; *Eurycotis finschiana* Sauss. and Z., and *Periplaneta americana* Linn.—C. S. CARTER, Louth.

—: o :—

LEPIDOPTERA.

***Exapate gelatella* in Yorkshire.**—On the last week in October, whilst crossing the moor near Ogden Reservoir, which belongs to the Halifax Corporation, there must have been thousands—indeed, it would not be using exaggerative language to say scores of thousands of *Exapate gelatella.* It absolutely swarmed, and was not confined to any particular part of the moor over which I travelled. On the 8th inst I saw this species in plenty on the moors near Keighley, but it was not so abundant as on Ogden Moor. At the former station I secured one female, which is by no means an easy thing to accomplish.—E. P. BUTTERFIELD, Wilsden.

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We have received the Report of the Museum Committee of the Borough of Warrington. It includes a list of valuable additions to the collections, and particulars of the progress made in the various departments during the year.

Part 15 of J. W. Taylor's Monograph of the Land and Fresh Water Mollusca of the British Isles has just been issued. It contains full details of the distribution of species of *Hyalinia* and *Zonitoides*, and there is an excellent coloured plate of the *Zonitidæ*.

We regret to record the death of Mr. William Waite, of Cliff Cottage, Clayton West, at the age of 68 years. Mr. Waite was a good 'all-round' naturalist, and took a particular interest in microscopy and astronomy. He was one of the first members of the Yorkshire Naturalists' Union.

THE NORTH SEA.*

In this pamphlet Mr. Wheeler has reprinted, with additions, an article appearing in 'The Engineer' for May 1907. The sections dealing with the sea and its adjoining coasts as they appear to-day, are clear, concise, and apparently accurate. But in referring to those early times when man was not known, and of which we have no written record, we might use Mr. Wheeler's own words, and say 'certain land-marks and data exist from which inferences may be drawn, but there is room for wide difference of opinion as to the conclusions arrived at.' We certainly think that the author gives too much credit to the glacial period in connection with the formation of the North Sea and its adjoining lands. For instance, on page 3 we find 'between the coast of Yorkshire and Durham there are indications that a large fiord extended inland for over one hundred miles, nearly to Nottingham, the area of which is now occupied by the large level plain known as the Vale of York, the drainage from which found its way to sea at the outlet now occupied by the estuary of the Tees. The Chalk Wolds formed a continuous line through Yorkshire and Lincolnshire, and the sea washed the foot of the Wolds. The Humber, as a river, did not exist at that time.' This seems very simple and straightforward, but, unfortunately, Mr. Wheeler does not quote references to his authorities, nor does he give us any data upon which these generalisations are formed, assuming they are his own. That there was a deep inlet in what is now the Vale of York is fairly certain, judging from the details of borings; but that it extended from Nottingham to the Tees' mouth, and joined the sea there, is not proven. It is more than likely that the Vale of York fiord was joined to the North Sea somewhere to the south; possibly through the Humber gap, which certainly *did* exist at that time. The pre-glacial floor of the Humber has been exposed in more places than one; its direction, across central Holderness to the North Sea, has been demonstrated by borings—a fact referred to in several papers which have been published by Messrs. Kendall, Stather, Crofts, and others. It also simplifies matters to learn that 'at the close of the glacial period, the whole of the northern part of Europe was buried in a deep covering of ice and snow, under which the highest mountains of Scotland and England were buried several feet deep, and which still bear the marks where the moving glaciers passed over them. It is estimated that this covering was, at least, ten thousand feet in thickness.' Unfortunately, the results of detailed work in different areas do not enable the matter to be dealt with in this easy way. For instance, the evidence of the extra-morainic lakes which Prof. Kendall has shewn in England and Scotland is difficult to account for on the ten-thousand-feet-ice-cap theory. It is also possible to find evidence in the field to shew that this alleged enormous thickness of ice was not able to over-ride the cliffs at Bempton, which are under five hundred feet in height.

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* The North Sea: Its Physical Characteristics, Tides, Currents, and Fishery, by W. H. Wheeler. J. D. Potter, London, 1908. 41 pp., price 2/6.

Later, the fiord was blocked at its mouth, the waters were ponded up, and eventually burst through the Chalk Wolds ' and the Humber outfall was opened out. The Chalk Cliffs that extended from Flamborough to the Humber were also cut away,' we read. But, as sections and borings prove, the Chalk Cliffs are still there, though, like parts of the old Humber bed, they are buried beneath the drifts.

Similarly the author accounts for the formation of the Straits of Dover by the ice-bergs and waters formed at the close of the glacial period bursting through the barrier, and thus separating England from the Continent. As a matter of fact, however, this separation took place at a much earlier period as has been shewn over and over again, on both geological and palæontological evidence.

In the same way it is pointed out that ' an examination of the oldest charts to which reference can be made shews that these sand-banks [off the Wash, Norfolk, etc.] have maintained their present position for the last century and a half.' This may be so, but we doubt very much indeed whether ' it is therefore fair to presume that they have been in existence ever since the time when this sea was stamped with its present form ; and owe their origin to the torrents that were poured into the sea at the termination of the glacial period, and the great rush of water that took place when the barrier at the southern end was breached.'

In speaking of the alleged depression of the land since the glacial period, as thought to be indicated by the so-called ' submerged forests ; ' the deposits containing remains of ' bears, elephants, etc., cannot be post-glacial, or these animals were not then living in the district ; the evidence they give, therefore, of a post-glacial depression, falls to the ground.

It will thus be seen that this interesting book contains some points upon which opinions may differ, but as we know Mr. Wheeler welcomes criticism, we have not hesitated to offer the preceeding remarks. When, however, we come to that part of the book dealing with ' Tides, Currents, and Winds,' we find him on surer ground (if we may use an ' Irishism '), and we shall not cross swords with him there, as we should doubtless soon be swamped !

When Mr. Wheeler leaves his engineering sphere and invades geological territory, it is a duty and a right, in view of Mr. Haldane's scheme, to defend our own land ! Hence these words. T.S.

SOME NEW NATURE BOOKS.

The production of volumes dealing with natural history proceeds apace, and at the present moment our desk, which is rarely particularly tidy, is almost covered with books of varying worth ; a few are sound, scientific treatises, containing original information ; some are carefully written in a popular style, and whilst they professedly contain little that is new, they will doubtless further the study of nature. Others, however, are obviously written to sell, and whilst they may not do very much harm, they are not likely to further natural science.

We have received part 16 (concluding part) of Kearton's **'British Birds' Nests'** (Cassell & Co., 1s.). It contains a large number of excellent photos of nests and nesting sites, with suitable letterpress.

Under the title **'The Adventures of Cock Robin and his Mate,'** (Cassell & Co., 240 pp., 3/6), Mr. R. Kearton has produced an attractive volume for young readers. Besides giving an interesting account of the birds, the author endeavours to encourage his readers to be kind to their feathered friends. There are reproductions of 120 photographs by the brothers Kearton, which add much to the value of the book. The title, however, seems to be a little elastic, as the book includes descriptions of owls, rooks, swans, crows, gulls, cormorants, spiders, butterflies, beetles, hedgehogs, daisies, etc., etc.

Trees shown to the Children, by **J. H. Kelman,** described by C. E. Smith. T. C. and E. C. Jack. 131 pp.

This is a welcome addition to the admirable ' Shewn to the Children ' series, to which we have had the pleasure of referring on previous occasions. The illustrations of the leaves, and other details of the trees are all that can be desired. The paintings of the trees themselves, however, though they may appeal to the ' impressionist,' will, in some cases, hardly impress a young mind with a correct interpretation. The oak (plate I.), more resembles a piece of lichen ; the elm (plate VIII.) might be a cloud ; the white willow (plate XV.) would do for a snow scene ; and the hazel (plate VI.), might be anything.

The Nature Book. A popular description by pen and camera of the delights and beauties of the open air. Cassell & Co., 372 pp., 12/- net.

In this beautiful volume, Messrs. Cassell have bound together the various parts [of ' The Nature Book,' which appeared fortnightly, and have been previously noticed in these columns. Quite apart from the pleasing letterpress, written by capable authors, the book contains some hundreds of photographs, representing Nature in her various phases—mountain and stream, mammal, bird and insect, tree, shrub and fungus. In addition, there are a number of coloured plates, mounted on tinted paper ; the whole forming an admirable gift-book. The general ' get-up ' of the volume also leaves nothing to be desired.

Little Gardens and How to Make the Most of Them, by **H. H. Thomas.** Cassell & Co., 150 pp., 1/6.

This book is full of useful and practical hints on laying out, stocking and caring for small gardens. The flower-garden receives chief attention, and is treated from so many points of view, that the suggestions are helpful in laying out a garden in almost any aspect. The illustrations are very numerous, many from photographs, and cannot fail in suggesting ideas suitable for small gardens. Methods of pruning, budding, layering, trimming, and other forms of training and propagating plants are given, and usually illustrated by diagrams which help much to elucidate the text. The two last chapters deal with the kitchen garden, and the growth of fruit trees. Throughout, copious lists of species suitable for various conditions are given.

Animal Life in Malaysia, by **J. Frank Daniel.** Second Edition The Bobbs-Merrill Co., Indianapolis. 220 pp.

This is evidently intended for the use of teachers in giving nature study lessons to scholars, and contains useful lessons on the more important forms of vertebrate and invertebrate life ; the illustrations being drawn from the Malaysian islands. Each chapter contains the main points likely to be of service to youngsters, and is followed by a list of questions bearing on the lesson. These are usually very carefully drawn up. The book is illustrated by a variety of blocks, several from photographs being excellent. Some, however, are from ' drawings,' and should certainly be replaced by better examples in another edition. We doubt if anyone would have guessed what the ' head of the two-horned African rhinoceros ' (p. 34) was, if the description had not been given. It would look much better up-side-down, and labelled ' the devil.'

British Country Life in Autumn and Winter. Edited by **Edward. Thomas.** Hodder & Stoughton, 240 pp., price 8/6 net.

This is a companion volume to that for ' Spring and Summer ' noticed in our columns for December 1907, p. 438, and the remarks then made about the charm and beauty of the publication equally apply to the present volume. We must also again refer to its remarkably low price, having regard to the size of the book, and the wealth of coloured plates mounted on tinted paper. There are forty-three chapters in the book, written by Canon Vaughan, Richard South, G. A. B. Dewar, A. W. Rees, J. Walpole Bond, A. H. Patterson, and other well-known writers. The subjects dealt with are varied, and include Richard Jefferies, Gilbert White, Our Vanishing Fauna, The National History of Place Names, The Entomologist's Methods, etc., etc. The book is light, the type is large, the illustrations are ' pictures,' and the whole of the articles are very entertaining. What better companion could one want for a leisure afternoon ?

Of course we could hardly expect to refer to new natural history books without including something from the pen of Mr. W. P. Westell. His latest, **' The Story of the Sea and Shore '** (London, Robert Culley, 343 pp., 5/- net), is prepared in his usual style. As usual, also, he is mainly indebted for the success of his book to photographers and artists who have supplied the illustrations. The present volume deals with whales, fishes, seals, birds, molluscs, jelly-fish, ' plants and shrubs,' etc. We notice Mr. Westell visited Yorkshire, and walked forty miles in a day. On reading that part relating to the Birds of the Flamborough Headland, we found it to be uncommonly well done, having been largely ' lifted ' from Mr. E. W. Wade's well-known pamphlet on that subject.

The source of the information, however, is acknowledged, as well as is the source of most of the information in the volume. In this connection, a little care may have been exercised in the spelling of the author's names. As usual, the author modestly informs his readers that he has ' endeavoured to deal in a bright, entertaining, and accurate manner with the creatures whose absorbing biographies are here under consideration.' The title page informs us also that Mr. Westell is an ' Exhibitor before the Royal Society.' ' The Story of the Sea and Shore ' is well illustrated, and will make a useful prize-book for elder boys and girls.

We have received volume I. of **' The Book of Nature Study,'** which bids fair to be *the* book of nature study. The work is to be completed in six volumes, at 7/6 net each. (London, The Caxton Publishing Co.). It is under the general editorship of Dr. J. B. Farmer, F.R.S., and from the following list of contributors, it will be seen that the editor is supported by an excellent staff :—Prof. J. A. Thomson, Mr. W. P. Pycraft, Prof. W. W. Watts, Dr. W. H. Lang, Mr. A. D. Hall, Mr. O. H. Latter, Dr. Marion I. Newbigin, Miss C. L. Lawrie, Dr. F. Cavers, and Mr. J. G. Hennesey. Dr. Farmer's interest in the nature study movement is well known, and it can safely be said, judging from the volume before us, that he is carrying out his scheme in the present series on ideal lines. Each of the chapters is a complete essay in itself, and brings together information not usually accessible in a popular form. The following headings of some of the chapters will indicate the original lines upon which this work is being prepared :—' The Clothing of Mammals ' ; ' The Colouration of Adult Mammals ' ; ' The Colouration of Young Mammals ; ' ' The Essential Characters of Birds ' ; ' Seasonal Changes of Plumage ' ; ' The Living Fish ' ; ' The External Characters of Fishes ' ; ' The Life Histories of Fishes,' etc., etc. The volume contains over two hundred pages, and is illustrated by several plates (some coloured), and text figures, as well as by a ' Dissected Model of a Pigeon ' on the inside of the front cover. There is no doubt that ' The Book of Nature Study ' will have a ready sale. A detailed prospectus of the work will be sent on application to the publishers, on mentioning ' The Naturalist.'

Conditions of Life in the Sea, by **James Johnstone,** (Cambridge University Press, 332 pp., 9/- net), is one of exceptional merit, and has the further advantage of dealing with a subject which is far too neglected. The author has had considerable practical experience, and has also made himself familiar with the literature on the subject with which he deals. Throughout the work the fullest references to special memoirs are given, in this way greatly adding to its value. The book is professedly a short account of quantitative marine biological research, and as such, appears to be the first attempt of its kind made in this county, though there are treatises in German and other languages. The book is in three portions :— Part I. is rather elementary in treatment, the object being to supply an account of those facts of oceanography which are not likely to be familiar to the reader who is not specially interested in marine biological investigation. Part II. deals with the methods and results of quantitative marine biological research ; and Part III. with the general conditions of life in the sea. Mr. Johnstone begins by giving a useful illustrated summary of the modern methods of sounding and dredging, and deals with the life in the sea, and the sea fisheries. There is also a chapter on the oceanography of the north-western ocean. He then refers to the distribution of the plankton, quantitative plankton investigation, a census of the sea, and the productivity of the sea. The third section includes a description of bacteria in the sea, and the circulation of nitrogen. There are several valuable appendices, not the least useful being the Bibliography. The Index is also very full. The volume is well illustrated, and will prove of great service to the increasing number of students of the lower forms of life occurring around our coasts.

NORTHERN NEWS.

We regret to record the death of Mr. Bennett H. Brough, F.G.S., the Secretary of the Iron and Steel Institute. He was taken ill during the proceedings of that body at Middlesborough early in October, and died shortly afterwards.

Mr. M. A. C. Hinton, in the 'Geological Magazine' for October, records the discovery of a monkey's bone in the Norfolk Forest Bed. In the same publication Dr. F. A. Bather has a useful note on Professor Nathorst's studies of Fossil Plants.

An admirable paper on 'The Preparation and Preservation of Fossils,' by Dr. F. A. Bather, of the British Museum, appears in the 'Museums Journal' for September. In this, the various methods of preparing fossils, and freeing them from their matrix, are carefully set forth. There are also some useful hints on the preservation of fossils.

The authorities at the Hull Museum would like to receive a few more orders for the Catalogue of the Dobrée collection of European Noctuæ, by Mr. H. B. Browne, M.A., in order to expedite the printing. Orders for the list, which will be published at one shilling each, will be gladly received by the editors of this journal.

Mr. A. R. Gale records that on September 28th he shot an adult male Yellow-browed Warbler on the Holderness Coast ('British Birds,' Nov.). Mr. H. F. Witherby secured one at the same place a week later. Mr. G. W. Murdoch, in the same journal, records finding a Kingfisher's nest with four young nearly ready to fly, near Bentham, as late as October 10th.

On the invitation of the Executive Committee of the Yorkshire Naturalists' Union, Mr. W. H. St. Quintin, J.P., M.B.O.U., of Scampston Hall, Yorkshire, has accepted the office of President of the Union for 1909. Mr. St. Quintin during 1908 was the President of the Union's Wild Birds' and Eggs Protection Acts Committee, and has taken a keen and practical interest in the preservation of the fauna of the county.

With regard to the remarks about the Turtle-dove, which appeared in the report of the meeting at Hampole ('Naturalist,' 1908, p. 381), Mr. W. Gyngell informs us that the species is by no means rare in the Scarborough district, where it nests annually, almost within the borough boundary. This fact was also pointed out some time ago in these columns by Mr. Riley Fortune. It is also recorded for Wetherby, and nests regularly at Plumpton, near Harrogate, and the Rev. F. H. Woods informs us that a pair has bred for many years at Kelleythorpe, near Driffield.

We notice that one of the 'popular' natural history journals has started a geological page; and the leading article in a recent issue is on 'Fossil *shells*,' and is illustrated by five blocks, three of which are of trilobites, and another illustrates an 'Encrinoid' head. There is an illustration of '*Atrypa riticularis* [sic], a bractiopod [sic], or lamp-shell, which *has the outer appearance of a* bivalve, but is structurally very distinct! There is also a picture of a *Pleuropomaria,* and a *Gamellibranch.* These and other subjects are discussed in this article on 'Pælaontology' [sic]. The ordinary English words, however, are usually spelled correctly.

We are sorry to find it necessary to call the attention of our contributors to the conditions appearing on the cover of this journal, and particularly to the following paragraph:—'Articles and notes sent for publication in 'The Naturalist,' are accepted *on the understanding that such publication is not anticipated elsewhere.* Should the author of any short article wish its simultaneous appearance in another journal, *mention should also be made of such wish.* The copyright of all the contents of 'The Naturalist' is reserved to the proprietors. This will not prevent reproduction of any article *on leave being expressly obtained* from the editors, and *full acknowledgment given.*"

CLASSIFIED INDEX.

COMPILED BY W. E. L. WATTAM.

It is not an index in the strict sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators, the actual titles of papers not being regarded so much as the substantial nature of their contents.

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CORRIGENDA.

Page 65, line 24, *for* " seventy-eighth," *read* " eighty-fifth."

" 157, line 26, *for* " Lincs.," *read* " Notts."

" 193, *for* " Candley," *read* " Cautley."

" 299, line 29, *for* " Coclotes," *read* " Coelotes."

" 385, line 5, *for* " Chthonius," *read* " Clithonius."

" 424, line 5, *for* " Barnsley," *read* " Sheffield."

" 379, *for* 'Explanation of Drawings' there given *read* A.—Full fig. (enlarged). B.—Profile of Cephalothorax. C.—Left palpus from outer side. D.—Left palpus from outer side of *Erigone atra* Bl. for comparison with C (vide *e* and *d*).

Pages 418-419, *for Acicula lineata read Caecilianella acicula* in every instance.

Insert Caecilianella acicula under
(37) Garbutt's Garton Slack.

Delete Acicula lineata
Insert Vallonia pulchella } in (161) Garton Slack.

Insert under (51) Aldro *Littorina littorea*
(65) Birdsall Brow; the line will read
(65) Birdsall Brow | *Caecilianella acicula* | well-known burrowers.

5 DEC.

1908 December 1

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THE

NATURALIST:

A

MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND

EDITED BY

THOMAS SHEPPARD, F.G.S., F.S.A. SCOT.

CURATOR OF THE MUNICIPAL MUSEUMS, HULL.

PAST PRESIDENT OF THE HULL SCIENTIFIC AND FIELD NATURALISTS' CLUB, OF THE HULL GEOLOGICAL SOCIETY; HON. SECRETARY OF THE YORKSHIRE NATURALISTS' UNION; HON. LIFE MEMBER OF THE SPALDING GENTLEMEN'S SOCIETY; OF THE DONCASTER SCIENTIFIC SOCIETY; ETC.

AND

THOMAS WILLIAM WOODHEAD, Ph.D., F.L.S.

LECTURER IN BIOLOGY, TECHNICAL COLLEGE, HUDDERSFIELD;

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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1909.

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JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.

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FOR 1909.

NOTES AND COMMENTS.

LINCOLNSHIRE NATURALISTS.

THE annual meeting of the Lincolnshire Naturalists' Union was held at Lincoln on December 3rd. There are 112 members in the Union. The Rev. E. A. Woodruffe Peacock presented 60,000 notes on the Flora of Lincolnshire, and it was decided to have them published. The Rev. A. Hunt read a paper on 'Pre-historic Man in Lincolnshire.' In this he said it was 'possible to reconcile the teachings of scientific results with the scriptural narratives. There was a Bronze Age in the Bible . . . Bronze (translated brass in the Pentateuch) was mentioned forty-five times. Iron was only mentioned four times.' Mr. W. Denison Roebuck, of Leeds, was elected president for 1909.

DR. W. E. HOYLE.

We should like to sincerely congratulate Dr. W. E. Hoyle, of the Manchester Museum, on his appointment as Director of the new Welsh National Museum at Cardiff. Dr. Hoyle's excellent work at the Owen's College Museum is well known, and the collections under his charge have long been looked upon by his confréres with envy. Dr. Hoyle has also taken a keen and practical interest in the work of the many Manchester scientific societies, and, consequently his departure will be much regretted. At the Leicester meeting of the British Association he was the President of the Section for Zoology, and gave an admirable address on the classification of the Cephalopoda, a subject he has made a special study.

NORWICH MUSEUM ASSOCIATION.

We have received the First Annual Report of Proceedings of the Norwich Museum Association, founded in 1907 for the object of extending the sphere of usefulness of the Norwich Museum. A series of lectures has been given on such subjects as 'The food of birds,' ; 'The House-fly, etc., and other insects as carriers of disease' ; 'Some Fungoid Diseases of Plants' ; 'The Nature and Properties of Soils,' etc., etc. These are given by specialists, and have been well attended, and much appreciated.

MUSEUM CONFERENCE AT ROCHDALE.

A Conference of Museum Curators was held at Rochdale recently, representatives being present from Accrington, Blackburn, Bolton, Bootle, Bury, Hull, Keighley, Liverpool, Manchester, Sheffield, Stockport and Warrington. The Museum and Art Gallery are of recent erection—the former being small. It contains, however, representative collections of local geological and archæological objects. Papers and exhibitions of interest to Curators were brought forward by Dr. W. E. Hoyle, Messrs. W. S. Laverock, S. L. Mosley, R. Bateman and F. Williamson. Lieutenant-Colonel Fishwick, the Chairman of the Rochdale Museum Committee, entertained the visitors.

LIVERPOOL BIOLOGISTS.

The Liverpool Biological Society has again earned the gratitude of all naturalists by publishing so excellent a volume of Proceedings and Transactions as that just issued for 1907-8.* Besides a review of the work of the Society during the year, it contains the Presidential Address of Mr. W. T. Haydon, on 'The Seed Production of *Pinus sylvestris*'; 'The Twenty-first Annual Report of the Liverpool Biological Committee and their Biological Station at Port Erin'; a marvellous record of detailed and systematic work, by Prof. Herdman; a 'Report on the Investigations carried on during 1907, in connection with the Lancashire Sea-fisheries' laboratory, at the University of Liverpool, and the Sea-Fish Hatchery at Piel, near Barrow,' by Prof. Herdman and Messrs. A. Scott and J. Johnstone —a report of two hundred pages; and Mr. W. J. Dakin writes on 'Methods of Plankton Research.'

'CANCER.'

An unusually valuable feature in this volume is the Monograph on Cancer—the Edible Crab, by Mr. Joseph Pearson, which forms No. 16 of the Liverpool Marine Biological Committee's Memoirs—a series indispensable to the working zoologist. In this monograph, which contains over two hundred pages, and numerous beautifully prepared plates, is presented an account of the Edible Crab, which may be safely said to contain all that is at present known of the physiology and anatomy of the species. We heartily congratulate the Liverpool Society and Mr. Pearson on its production.

---

* Vol. XXII., 1908. 554 + xviii. pp., and plates.

'GRANNY' CRABS.

An interesting item of information is given with regard to certain worn and dilapidated crabs, known as 'grannies,' which are caught in abundance during July and August. These are not necessarily old nor female, but they are promptly killed, and thrown into the sea again by the fishermen. These crabs are unsaleable, and are said to have a strong bitter taste. It is considered, however, that these particular crabs are merely individuals which are approaching the time when in every second year, a crab this size will cast its skin. The probability is therefore that instead of being harmful, and likely to 'infect' their neighbours, they would, if left alone, cast their shells, and, after passing through a period as 'soft' crabs, again be normal, clean-looking healthy individuals, suitable for the market. Unless stopped, it is probable that much harm will be done to the local crab fisheries by the wholesale slaughter of the 'grannies.'

CUMBERLAND INTRUSIVE ROCKS.

At a recent meeting of the Geological Society of London, Dr. A. R. Dwerryhouse read a paper 'On some Intrusive Rocks in the Neighbourhood of Eskdale, Cumberland,' In this he pointed out that there appear to be five well-marked groups of intrusions in this district :—(*a*) The andesitic dykes in the neighbourhood of Allen Crags and Angle Tarn ; (*b*) The dykes of the spherulitic and felsitic group on Yewbarrow and High Fell ; (*c*) The dioritic ('bastard granite') bosses of Peers Gill, Lingmell Crag, and Bursting Knotts, with their associated dykes ; (*d*) The Eskdale Granite, with the granite-porphyry dyke running from Great Bank to Wasdale Head, and thence to Kirkfell Crags ; and (*e*) The dolerite dykes, having a general north-west to south-east trend.

The dykes of series (*a*) bear a very strong petrological resemblance to the Borrowdale volcanic rocks, into which they were intruded. Furthermore, they are weathered to much the same extent and have developed the same secondary minerals, among which epidote is conspicuous. They appear to be of Borrowdale age, and roughly contemporaneous with the lavas and ashes into which they are intruded. The spherulitic and more acid series (*b*) are considered to be also of Borrowdale age, though probably somewhat later than the andesitic series. The rocks of the dioritic group (*c*) are considered to be the holocrystalline and hypabyssal equivalents of the Borrowdale Lavas, and the author is of opinion that they also are of Ordovician age.

ESKDALE AND WASDALE GRANITE.

The Eskdale and Wasdale Granites (*d*) are much more acid, and show little sign of alteration, except that due to weathering and dislocation. They are undoubtedly intrusive into the Borrowdale Series, but seems to be pre-Triassic. Thus the intrusion is probably Devonian, like the neighbouring granite of Shap, which, with the exception of its large phenocrysts of orthoclase, is not dissimilar to some of the varieties of the Eskdale Granite. The basic intrusions (*c*) have been examined only where they come into proximity to the granite. They may well be connected with the great Tertiary basic flows of Antrim, as has been suggested by Mr. Harker. The granite becomes progressively more and more acid as its margin is approached, until, in some places, the percentage of silica amounts to 96.16. This is explained by the assumption that the magma, as a whole, was more acid than the eutectic mixture of quartz and orthoclase, and that consequently the excess of silica separated in the marginal portions, which were the first to solidify.

GEOLOGY OF HARROGATE.

A second edition of the 'Geology of the Country north and east of Harrogate,' prepared by Mr. C. Fox-Strangways, has just been published by the Survey, and we should like to congratulate both the Survey and Mr. Fox-Strangways upon the general excellence of the work. It is also illustrated in a way which is quite refreshing for a government publication—the reproductions of photographs by Mr. Godfrey Bingley being very fine indeed. There is also a coloured geological map of the district.

After dealing in detail with the various beds in the area, there are chapters on the physical structure, economic geology, the Harrogate springs, etc., the last being of particular value. There are appendices devoted to well-sections and bibliography, both of which are carefully compiled, and unusually complete.

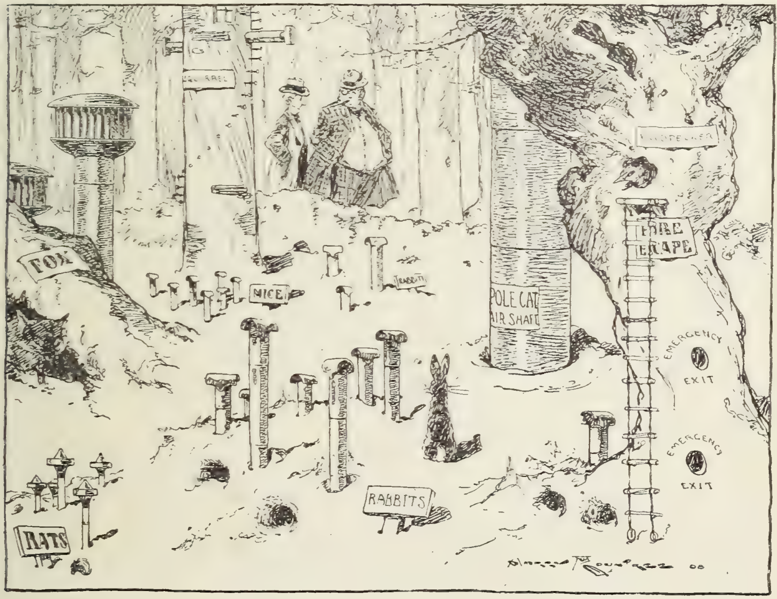
YORKSHIRE ZOOLOGISTS.

The Vertebrate Section of the Yorkshire Naturalists' Union recently held a most successful meeting at Leeds, which extended from early in the afternoon until late in the evening. Mr. Riley

Fortune presided. The papers and lantern exhibitions, enumerated on the cover of the 'Naturalist' for December, were given, and much of the valuable information brought forward will be permanently recorded in the pages of this journal. Reports of the year's work of the Vertebrate Section and of the Wild Birds' and Eggs' Protection Committee were also presented; Mr. W. H. St. Quintin, the Chairman of the latter, being present. These reports are being printed in the 'Transactions of the Yorkshire Naturalists' Union.' The next meeting of the Section will be held at Leeds on February 13th.

OUR DUMB FRIENDS.

Having regard to the care now being taken of our dumb friends, we notice our contemporary, 'Punch,' in the accompanying sketch, draws attention to the possible extremes which may be reached.



[*Reproduced by the special permission of the Proprietors of* '*Punch*'].

Hygiene for our Dumb Friends.

Harassed Landowner. "I can't understand why you complain. I've put in all the air-shafts, fire-escapes, emergency exits, etc., that you require."

Urban Sanitary Inspector. "But, my dear Sir, where is the provision for the Great Auk, should that bird elect to settle on your land."

YORKSHIRE NATURALISTS AT DONCASTER.

THE forty-seventh Annual Meeting of the Yorkshire Naturalists' Union was held at Doncaster, on December 10th. Partly on account of the wretched weather which prevailed, and no doubt partly on account of the meeting being held on a Thursday, the attendance was not what has been experienced in recent years; nevertheless, there was a goodly number present, and the Doncaster Scientific Society did its best to look after the interests of the visitors. The meetings were held in an excellent suite of rooms in the Mansion House, kindly lent by the Doncaster Corporation.

In the morning an excursion was held to Cusworth; where, nothing daunted by the elements, an enthusiastic if small party had a very profitable outing, and many interesting fungi and other specimens were shewn at the Conversazione as a result.

The various sections of the Union had representative meetings in the afternoon, at which the reports were adopted and officers for 1909 were elected. At the meeting of the General Committee, the Executive's Report on the year's working was presented, and, together with the financial statement, proved very satisfactory. It was shewn that in each of the Union's Sections and Committees, work of a valuable character had been carried out, thus making the Report a useful record of natural history observations in the county during the year. The Report was, perhaps, the most complete and most satisfactory that has ever been issued in the nearly half a century of the Union's existence.

The Excursions for 1909 were arranged as under :—

York, S.E., Market Weighton, Saturday, May 8th.
,, Mid-W., Bowland, Whit week-end, May 31st to June 2nd.
,, N.E., Runswick, Saturday. July 3rd.
,, N.W., Sedbergh, August Bank Holiday week-end, 2nd to 4th.
,, S.W., Cawthorne, Saturday, August 21st.

The Annual Fungus Foray will be held at Castle Howard, September 18th to 23rd.

The Annual Meeting for 1909 will be held at Scarborough, in December, and the members of the Scarborough Field Naturalists' Society have kindly invited the Union to be their guests.

The officers elected for 1909 were :—*President,* Mr. W. H. St. Quintin, J.P., M.B.O.U., Rillington; *Treasurer,* Mr. H.

Culpin, Doncaster; *Hon. Secretary*, Mr. T. Sheppard, Museum Hull.

The evening meeting was largely attended, and Mr. H. H. Corbett, the President of the Doncaster Scientific Society, was in the chair. Dr. Wheelton Hind delivered his Presidential Address, entitled 'On the Present Position of the Geology of the Carboniferous Rocks of Great Britain,'*—a most appropriate subject in view of the interest now being taken in the Carboniferous Series by many members of the Union, and also having regard to the part probably shortly to be played by Doncaster in reference to the output of coal.

In his introductory remarks, Dr. Hind stated:—'The honour done me in electing me as President of the Yorkshire Naturalists' Union is one which I can assure you I have appreciated most highly, my only feeling is one of regret that I have not been able to attend the meetings and excursions of the Society. When I accepted the position, I fully intended to do my duty, and to take a part in the excursions, but many causes have prevented my good intentions being fulfilled. I must thank most cordially those who proposed and elected me to the proud and important position of your President, and I am proud to feel that this honour is an appreciation of whatever little work I have been able to accomplish in the geology of the Carboniferous rorks and their fossils.

'I cannot pass to the subject matter of my address without alluding to the great loss which the world of science, and this Society in particular, has suffered in the death of Henry Clifton Sorby. It is not given to every one to establish a new department in science, or to attain the age of eighty-two with a brain capable of the highest scientific work; and fate was kind in sparing his to science for so long. The science of Petrology will be his lasting monument.'

A Conversazione was subsequently held in the large room at the Mansion House, at which was an excellent series of microscopes, and geological, botanical, and other specimens, many of extreme interest. Refreshments were also provided by the Doncaster Society.

Votes of thanks were passed to the Doncaster Society and the Corporation for their entertainment, and for the use of the rooms. T. S.

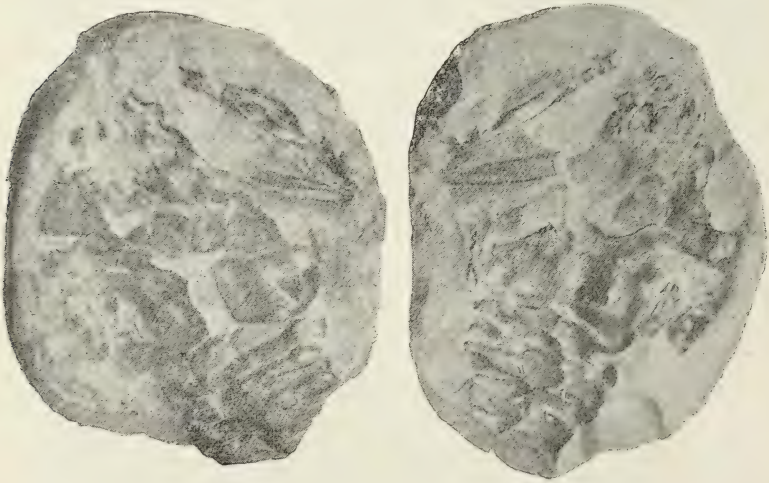
---

* This will be published shortly in these pages.

ON A SPECIMEN OF *ERYON ANTIQUUS* BRODERIP, FROM THE YORKSHIRE LIAS.

T. SHEPPARD, F.G.S., F.S.A.Scot.
Hull.

Mr. A. M. Murley has handed to me a glacially striated nodule from the Boulder Clay at Waxholme, East Yorkshire, measuring 4½ inches by 3¼ inches. This has been split, and reveals an excellent impression of a Crustacean, which Dr. Bather kindly identifies as '*Eryon* (*Coleia*) cf. *antiquus* Broderip, or a closely allied form.' The nodule is presumably derived from the Lower Lias of the Yorkshire Coast, from which horizon in other parts of Britain this species has been recorded, though this appears to be the first example from Yorkshire. The half of the nodule containing the specimen shows the carapace, abdomen, and one large chelate thoracic leg. The lower part of the abdomen is bent under the body; the tail-fan, if present, being hidden in the nodule.



The total length of the specimen is 10.5 centimetres. The carapace is about six centimetres wide, though the state of the specimen prevents a definite measurement. The hinder border of the cephalothorax is fairly concave forwards. At a distance of four centimetres from the posterior border, there is a triangular indentation, though the small tooth-like spine, described by Dr. Woodward as occurring on a specimen from

Lyme Regis,* is not well indicated on the Yorkshire example. At a distance of 4.5 centimetres occurs a second indentation called the cervical notch by Dr. Woodward, extending into the carapace to the extent of 1.25 centimetres. The carapace in front of this is coarsely tuberculated, and its edge is serrated.

In front of the carapace are the impressions of two antennules; the antennules themselves, to the length of nearly a centimetre, (together with the greater portion of the right claw, etc.), occur in the upper portion of the nodule, and clearly indicate their segmented character.

Unfortunately in the Yorkshire specimen, the smaller thoracic legs are not shown. As in the Lyme Regis example, described by Dr. Woodward, however, it possesses only one of the first pair of chelate thoracic legs, the comparative length of which is such a distinctive feature of *E. antiquus*. The total length of the example preserved in the nodule now being described, is 8.25 centimetres. The abdomen, so far as it is exposed, measures 4.25 centimetres. Its widest part appears to be at the first segment, which is slightly over 4 centimetres across. The extremities of this are curved, are better exposed than the other segments, and clearly shew the points of attachment of the legs. Each segment, which is coarsely granular, bears a well-defined keel on the centre of its tergal arch. In the nodule, to the left of the first segment, is a small claw, evidently belonging to one of the smaller legs.

As already explained, the tail-lobes or swimmerets are not exposed.

The surface of the carapace is strongly granulated. The central or dorsal line is marked by a ridge or keel, in addition to which two rounded ridges further sub-divide the carapace longitudinally.

Various species of *Eyron* are recorded from the well-known Solenhofen Limestone, and have been described by Spence-Bate.† That writer draws attention to the rarity with which the eyes are found in these fossil forms, and Dr. Woodward also emphasises the point, though he refers to one or two instances in which the eye occurs. In the specimen now being described, however, the left eye is exceptionally well shown, and is a prominent globular mass, 4 millimetres in diameter. The opposite side of the front of the carapace clearly shows the position formerly occupied by the right eye.

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* On *Eryon antiquus* Broderip sp. from the Lower Lias, Lyme Regis, Dorset. Geol. Mag., Oct. 1888, pp. 433-441. See also Q J.G.S., 1866, pp. 494-502.

† Geol. Mag., 1884, p. 307.

Dr. Woodward's paper is illustrated by examples of modern representatives of this ancient family of Jurassic Crustaceans, which were secured during the 'Challenger' Expedition, and to which reference should be made.

The lower part of the nodule containing the crustacean, is in the collection of Mr. A. M. Murley, of Hull. The upper part of the nodule which contains the antennules, the complete claw, or first chelate thoracic leg, and portions of the segments of the abdomen, as well as an excellent impression of the fossil in his possession, he has kindly given to the Hull Museum.

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Hazell's Annual for 1909. London: Hazell, Watson & Viney, Ltd., 3/6 net. This volume appears at a most opportune time, coming at the close of a year which has been fruitful of change, new legislation, and the rapid development of science and invention. It will prove of very great service to everyone who desires to keep in touch with current events. The busy man to-day has not the time to turn up the many books of reference to get the latest information on given subjects. 'Hazell's Annual' for 1909, furnished as it is with a complete reference index, enables the reader to turn up in a moment the latest information on almost every topic of current interest. In this volume he will find such articles as 'Housing and Town Planning,' 'Parliamentary Session,' 'Slump in Trade,' 'Religious Review of the Year,' 'The Unemployed Problem,' 'The Conquest of the Air,' and many other important topics. The review of scientific progress in 1908 is particularly welcome. The Editor is Mr. William Palmer, who is to be congratulated upon his new volume.

The Changeling. A Nature Story for Boys and Girls, by **Sir Digby Pigott, C.B.** London: Witherby & Co. 183 pp., 2/6 net.

The sub-title of this little book—'What a boy whose eyes had been opened, saw of the real life of the wild creatures round his home,' explains its scope. There are a dozen chatty chapters dealing with 'The Bees,' 'The Rooks,' 'The Cliff Climbers,' 'The Wild Geese,' 'The Mammoth,' etc., and numerous illustrations (some coloured), by the author and C. Tresidder, add further interest to the book. The story has reference to a boy whom the fairies changed, and enabled him to get an insight into the ways of the birds, and mice, and foxes. On one of his travels he took part in the cliff-climbing on Flamborough Head, of which operation a sketch is given, which looks suspiciously like a well-known picture-postcard view of these 'gallant men' of Bempton. And 'Tommy' was particularly lucky when he went to Flamborough, as in the first haul of 'many as good made that day there were a few cormorant's eggs, a clutch of three greenish blotched kittiwake's eggs, and a couple of razor-bill's . . . But nine out of ten were pear-shaped guillemot's eggs.' A good haul indeed, so good, that we wonder if Tommy really was there after all!

Guide to the Town of Brandon, and the oldest Industry in Britain, by **W. G. Clarke.** W. Broughton & Sons, Thetford, 46 pp., 6d.

This is so well written, printed and illustrated, that it is a pleasure to possess it. The author is well known for his work amongst the pre-historic weapons of Norfolk, and his description of the well-known flint-knapping industry is full of interesting detail. The guide is well illustrated, and very cheap at sixpence.

ON THE STATUS OF THE STONE CURLEW IN YORKSHIRE.*

E. W. WADE, M.B.O.U.

If scarcity be the touchstone of our interest in any bird, then surely the Stone Curlew is the most interesting resident species in Yorkshire, the northern limit of its breeding range in Britain.

Some 150 years ago, prior to the introduction of the present system of agriculture on the high wolds and waste lands of the county, when huge stretches of sandy warren and sheep-walk existed, the bird must have been as common as it still is in some parts of Norfolk and Suffolk, but at the present day it is almost extinct in our county. This change of conditions may be traced to the introduction of the turnip, by which alone the present rotation of crops became possible.

About the middle of the seventeenth century, the turnip began to be used in agriculture, but it was not till after 1760, when the growing demand for farm produce, owing to the increase of population and wealth from manufactures, began to have its effect upon prices, that the poorer soils were taken into cultivation. This movement reached its culminating point in the years 1795-1814, at the period of famine prices produced by the wars following the French Revolution, during which the enclosure of the wolds was carried on in earnest; and soils, which previously were thought too poor to pay for cultivation, were brought under the plough. The present order of rotation of crops on the wolds is :—

1.—Turnips.
2.—Barley.
3.—Seeds, *e.g.*, Clover, Ryegrass, Sanfoin.
4.—Oats.

Sir Mark Sykes, the father of the present Baronet, played a great part in this movement. There are old men still living on the wolds who can remember the ploughing up of some of the warrens, which they date sixty-three years back, and garnish their tale with stories of poaching escapades of the old days, and the last of such lands devoted to the cultivation of the rabbit was broken up within the last ten years only. The father of Ned Hodgson, of Bempton, lived at a time when open warren existed between that place and Bempton, land covered with the whins, coarse grass and short heather, typical of the old sheep-walks.

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* Read at a recent meeting of the Vertebrate Section of the Yorkshire Naturalists' Union.

Whereas then, 150 years ago, cultivation was carried on in the valleys only, and the high wolds and poorer soils were devoted to warren and sheep-walk, now, every acre of land that can be made to produce anything under the plough is cultivated. To a bird like the Stone Curlew, a lover of waste places and open country, this enclosure has meant gradual extinction. The records of the status of the bird in Yorkshire are but scanty ; for, unlike the Great Bustard, which it closely resembles in habits, it is not a sporting bird, and therefore no one thought it worth while keeping a record of the species. I think we may safely take it, however, that it ran on all fours with its large relative, and that Mr. Nelson's excellent account of the Great Bustard in "Birds of Yorkshire," will also give us the best picture of the history of the Stone Curlew in our county. Doubtless it bred extensively on the plains of York, where patches of scanty heather and uncultivated land here and there are the only remaining traces of the sandy wastes formerly existing, but we have no record of any of these, except Tollingham Moor and Cliffe Warren, situated on either side of the Market Weighton Canal, some four or five miles south-east of Market Weighton, and between Cliffe and Holme-on-Spalding Moor, on the borders of what was once the great Wallingfen.

Tollingham Moor, named by Dresser as a breeding place of the species, was ploughed up previous to the sixties, but upon Cliffe Warren, up to 1873, the species was well known to residents ; one of whom, Mr. Jno. Reynolds, now living at South Cliffe, can remember seven or eight pairs breeding near there, and still describes the wary nature of the bird, which would run from the eggs with head depressed, skulking behind each tuft of herbage, for one hundred yards, before taking to flight. Eggs taken from here were in the collection of the late Mr. N. F. Dobrée, of Beverley, and are still in that of Mr. F. Boyes, taken in the period 1868 to 1873. Mr. Boyes yet speaks with pleasure of listening to the wild musical cry of the bird, when it flew from the warren to its feeding ground in the evening. On the warrens of Lincolnshire—Brumby, Risby, Manton, etc., the bird bred in precisely similar localities till recent years, and an odd pair may perhaps linger there still, unless the march of civilization has wiped it out. Here my first study of its habits commenced.

These, however, are memories of the past. Turning to the present, there are but two localities where the Stone Curlew persists in Yorkshire as a breeding species, viz., one in the North Riding and the other on the Yorkshire Wolds.

Of the former, Mr. Oxley Grabham wrote in the 'Naturalist' for September 1897, with a photograph of 'the eggs of one of the last two or three remaining pairs of the bird which breed in Yorkshire.' The locality is an open secret in the North Riding, and to my certain knowledge, eggs have been 'lifted' there more than once in recent years, but happily the birds have increased, as Mr. Riley Fortune reported at the Yorkshire Naturalists' Union Protection Meeting on November 21st, 1908, that five pairs bred there this year, and another pair in a locality close at hand.

The second breeding place and last stronghold of the Yorkshire Stone Curlew is the Yorkshire Wolds, an entirely different ground from the flat, sandy warrens named previously. Rising in a series of gentle undulations from the plain of Holderness, on their Eastern border, the Wolds attain their greatest elevation on the west, north-west, and north edges, where they drop suddenly into the Plain of York, the Vale of Pickering, and the sea at Bempton Cliffs. Traces of their former wildness remain, in the valleys carved out by ice, and showing sometimes sides almost as cleanly cut as when the glaciers left them; in the patches of thin soil here and there, too barren even for modern agriculture to tackle, occasionally in land given over to scanty heather, coarse grass, and whin bushes, the covering of the old sheep-walks. But for our present purpose, their most salient feature is the broad sweeps of open country, fields of one hundred acres or more, covered with a soil largely composed of chalk and flints, out of sight of the villages, which, as a rule, nestle in secluded hollows. Here the Stone Curlew finds skulking ground enough, harmonising with his own inconspicuous plumage, and space where his quick eye detects the approach of an enemy afar off, and gives him opportunity to escape destruction. Here, in out-of-the-way corners, scattered in odd pairs wherever it can escape persecution, the bird leads a precarious existence.

In the 'Birds of Yorkshire,' mention is made of forty birds being seen in a flock at Ganton in October 1874. The greatest number seen together of which I can obtain any record in present times is eight, on 4th April, 1907, in a locality which shall be nameless, an earlier date than I can find any mention of either in Stevenson's 'Birds of Norfolk' or the 'Birds of Yorkshire.' Probably when flocking for the autumn migration, more might be observed if any record could be obtained. The birds soon separate, and each pair scatters to its own breeding ground, which is generally pretty near the same locality each year. The persistence of the Stone Curlew in returning to its old haunts was well illustrated on Brumby Warren in Lincolnshire, a favourite breeding place before the extension of the blast furnaces. Here, although footpaths were made through its favourite haunts, and its eggs were persistently robbed, it continued to struggle on for some years, in full sight of the glare of the furnaces, whilst the town extended over the warren till the bird finally became extinct. No doubt, to this persistence alone, we owe the fact of the birds still breeding in our county. We will suppose that it has selected the fallows as its nesting-place. If the eggs are hatched before the ground is broken up for turnips, well and good, for it is a position where their colour makes them all but visible. Next year the same field is sown with barley, and the bird lays there again. If the eggs escape the roller, they will be destroyed by the hoe or the sprinkler, and until the next year, when the field rests quiet in seeds, they have no chance of hatching safely, *i.e.*, for two out of four years rotation they are certain to be destroyed. Londesboro' may be taken as a typical instance of the bird's chance of reproducing its species on cultivatep ground. In forty years it has tried three times to establish itself there, on each occasion the eggs have been taken, the last date being May 1906, when the birds were destroyed or driven away, and have not returned. This part of the Wolds is too much cultivated, and the fields too small for safety. Fortunately the Stone Curlew has shewn some adaptability to circumstances. Thrice I have seen the nest in plantations, whether because the bird had kept to the old breeding-ground after it was planted, or had gone there for safety, I cannot say, but in the photo shewn in 'Birds of Yorkshire,' the nest was in a spinney thickly planted, among young trees ten feet high. In such a place of course, opportunities for escape before the searcher can observe the bird are obvious. No doubt the habit is exceptional, as only two other instances are mentioned, viz., one by Newton, and one by Stevenson. The favourite breeding-site appears to be a low spur of wold, not too much exposed to the wind, where a good look-out can be kept; but I have seen the nest on bare chalk pebbles, and on grass, and even on the side of one of those steep valleys so peculiar to the Wolds, where the out-look is very much restricted.

On the Wolds, the nest is usually lined with chalk pebbles; on the Suffolk Warrens, with rabbits' dung. I have even seen grass in it here. No doubt the object of the lining is to isolate the eggs from the damp ground. The eggs are always two, of which one is sometimes addled. The earliest eggs I have seen were on 5th May, very 'hard sat,' and the latest on 11th May, fresh, the former in a plantation, the latter on the open wold. The period of incubation, as stated by Mr. E. G. Meade Waldo, in 'British Birds,' August 1907, is twenty-six to twenty-seven days, which I have verified from my own experience, so that we have our wold birds laying at the unusually early date of 15th April or thereabouts, and almost a month's interval between the earliest and latest eggs. If the eggs are taken, a second or even a third clutch is laid. I have heard of fresh eggs being taken on Brumby Warren as late as 11th July. One egg is generally more incubated than the other, shewing that the bird has to guard them against natural enemies. The young, when hatched, are covered with a beautiful light buff down, with two fine black streaks down the back. Their first instinct seems to be to crouch with head along the ground, and closed eyes, and their colouring makes them almost invisible on the flinty soil.

At the nest the parent bird is incredibly shy, being absolutely invisible. Apparently it runs from the eggs, and does not fly up, for it is in my experience, impossible to see it at all, and an hour or two's watching is of no use to detect it. Only if the eggs are well incubated, and the intruder remains too long near the nest, the bird's cries of distress may be heard, and it may be seen standing sentinel on the ridge of a distant hillside, with head drawn back into its shoulders. Once I detected it watching me from behind a molehill, its eye just projecting above the soil.

The natives, as a rule, know the bird only by its habit of flying over the valleys before stormy weather comes.

How many pairs there may be on the Wolds it is impossible to say. They are so scattered, so shy and invisible, that one might go over the ground where they were a dozen times and never see them. Mr. Hewett, at the meeting of the Yorkshire

Naturalists' Union, on November 21st, 1908, said he knew of four or five nests, and the writer could beat that number of pairs of birds.

The important question for us is 'What chance has the bird of surviving?' It must be constantly disturbed, now and then it is shot, especially on migration, when odd birds have been obtained near our coasts even in winter; and in so small a stock, the danger of inbreeding is a serious one, unless the numbers are recruited by immigrants from other districts. Its rate of reproduction is also a very slow one. The eggs are sometimes taken by dealers, as I have heard of their being offered in Beverley in exchange during recent years, and their protection in so wide an area appears hopeless. Game preservers, however, might forbid their keepers to shoot the old birds.

On the other hand, the cultivation of the Wolds appears to have reached its highest point. The natives take no interest in the bird. Its extreme shyness, and the protective colouring of bird and eggs in such an environment are encouraging. That it can be driven away seems improbable, for its nature is to return to the haunts where it was bred, until it becomes extinct, and we may gather some hope from the history of the bird on the chalk downs of Hampshire.

Gilbert White, in his 'History of Selborne,' 1768-1788, speaks of the plentifulness of the Stone Curlew, and the ease with which it could be detected. His successor, Thos. Bell, who re-edited his letters in 1877, says:—'In thirty years I have never seen one, alive or dead.' But Messrs. Kelsall and Munn, in 'Birds of Hampshire and the Isle of Wight,' 1905, say:—'Some recent observers, living at Selborne, have fancied that the species has disappeared from the neighbourhood, but we have good reason to believe that it still nests within a very short distance of the historic village. For some reason or other, the Stone Curlew has developed very suspicious and wary habits, and though many eggs are destroyed when the young wheat is rolled, they usually manage to rear a brood.' If, then, this is true of the chalk downs of Hampshire, why not of our own Yorkshire Chalk Wolds?

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In an article appropriately headed 'Namesakes in Science,' in a contemporary, we notice a 'son of his father,' makes his debut as an artist-naturalist. He is evidently following in his father's footsteps. Oddly enough, his first published sketch is of the Lyre Bird.

NOTES ON THE LEPIDOPTERA OF SOUTH YORKSHIRE IN 1908.

B. MORLEY.

THE past season has been a most interesting one in the Skelmanthorpe district, and, from the collector's stand-point, a great improvement on the season of 1907. With certain exceptions, insects have been vastly more plentiful, especially during the summer months. The severe wintry weather did not seem to have been very disastrous to hibernating larvæ, and many had commenced feeding when the arctic conditions became so very pronounced in mid-April. That adversity, however, did not seem to diminish their numbers much, for when spring-like conditions did obtain the herbaceous feeders were very abundant. The tree feeders did not fare so well, for seldom in our experience have the larvæ of *Xanthia citrago, X. silago,* etc. been so scarce. Another exception was the larvæ of *Agrotis agathina.* This was exposed to the full blast on the high grounds of its haunts, at a time when it should have been feeding, and no doubt caused its numbers to be thinned considerably. When 'sugaring' was commenced in mid-June, there was further proof of the herbaceous feeders having been in abundance, as on to the middle of September 'sugar' was seldom a failure; on favourable nights insects absolutely swarmed. During 1907, on what were apparently good nights, nothing much came to the patches. During this season on the other hand, insects were always about on what apparently seemed to be unpropitious nights, a fact that was once or twice especially noteworthy. For example, the night of July 18th was miserably cold and damp, with a north wind and an occasional drizzle—a night most collectors would have voted hopeless; and yet it justified the undertaking of a fairly long journey, for insects came to the patches freely, and useful collecting resulted.

During their respective times of occurrence, the following were in extraordinary abundance, and though most are regarded as common species, it will be of interest perhaps, to give a detailed list:—*Xylophasia rurea, X. polyodon, Triphæna pronuba, T. comes, Noctua augur, N. baja, N. festiva, N. brunnea, N. c-nigrum, N. xanthographa, N. plecta, Agrotis exclamationis, Mamestra brassicæ, Apamea basilinea, A. oculea, A. gemina, Leucania pallens, L. impura, L. lithargyria, Miana strigilis, M. fasciuncula, M. arcuosa, Euplexia lucipara.*

The following were very common:—*Hadena dentina, H. thalassina, H. adusta, H. pisi, H. oleracea, Aplecta nebulosa, Mania typica, Xylophasia scolopacina* (at Haw Park, Wakefield), *X. lithoxylea, Mamestra furva, Cymatophora duplaris, Cosmia paleacea, Orthosia suspecta,* and many others were frequent visitors to the 'sugar' patches. Flowers also proved to be well worth attention. Sallows, of course, produced nothing worthy of special mention, owing to the wintry weather when they had come into bloom. The flowers of campion and wound-wort had many visitors, including *Plusia chrysitis, P. iota, P. pulchrina,* with many of the species mentioned above. Ragwort also was much patronized. Heather had much attraction for *Noctua glareosa, N. dahlii, Hydrœcia nictitans,* and many others.

After mid-September, 'sugar' lost its attraction for the noctuæ, and nothing of much interest occurred as a result of its use during autumn. Other noctuæ, for which neither 'sugar' nor flowers have little attraction, now claim notice. An effort made to turn up *Hydrœcia petasitis* resulted in the species being found common at Huddersfield and Normanton. It no doubt occurs in most places in the West Riding, where butter-bur is plentiful.

Polia chi was exceedingly common, and was perhaps the most interesting species of the year in the Skelmanthorpe district. Its habit of sitting on the walls in the day time, gives the collector fine chances of taking his choice without much trouble. Careful search this season was rewarded with good results, its variety *olivacea* was common, as was also a very heavily marked form, not referable to *olivacea*. Another form frequently found has the wings a drab colour, with all the markings obliterated, except the black *chi* mark, which is very small and well defined. It is a very fine and beautiful form, probably of recent development, and the most decided variation from the type we have noticed in the Skelmanthorpe neighbourhood. *Dasypolia templi* has been common on the street lamps in this district, and two specimens are reported to have been taken at Lartington, near York.

On the moors near Penistone, larvæ of *Bombyx* var. *callunæ* were common, and the imagines of *Cloantha solidaginis, Larentia multistrigaria, L. cæsiata, Oporabia filigrammaria* and *Anarta myrtilli* were very plentiful.

The season seems to have been a good one for *Acherontia* *atropos*; numerous reports of its capture from various parts of the county are to hand. In the neighbouring village of Shepley a dead one was found in a spider's web. It was tethered fast in the web, and had probably been killed by the spider, surely a record of spider pugnacity, for besides having its clumsy captive to contend with, its efforts in securing the monster would be accompanied by a squeak sufficiently unnerving to fill with fear much higher organisms than spiders. The insect was a male, and, considering its ignominious death, was in fair condition. The Geometræ have always been below the average, which is rather surprising, considering the fine summer we have had, but probably the cause may be traced to the miserably bad weather of last year. Many usually common species have scarcely put in an appearance, and others have not been noticed at all. However, *Selenia lunaria*, a scarce species in the West Riding, has been taken both at Barnsley and Skelmanthorpe. A visit to Thorne Waste on July 11th, although a wet day, resulted in the following being taken commonly:—*Macaria liturata, Timandra amataria, Eubolia limitata*, and other common geometræ. *Ino statices* and *Zygæna filipendulæ* were also both common there. Of butterflies there is little to report, the Skelmanthorpe district is a very poor region for the Rhopalocera. Melanism seems to be on the increase, and is especially noticeable in *Aplecta nebulosa*, the var. *robsoni* being common (at Haw Park); and the local races of *C. viminalis, A. agathina, M. strigilis* and *C. duplaris* seem to be entirely black. *X. polyodon, L. multistrigaria, L. cæsiata, A. oculea, B. repandata, P. pilosaria* are all species very much subject to melanism; indeed, extreme black ones of each species are of common occurrence.

Another species in which melanism was not suspected has been brought to our notice in *Himera pennaria*. Mr. H. Dyson, of Skelmanthorpe, reared a brood from eggs obtained from an apparently quite ordinary female, and nothing more than an ordinary bred series of insects was expected as the result. All the brood, however, are of a dark reddish brown colour, darker than any we have previously seen, and many of the males have the basal half of the fore-wings heavily suffused with lead colour, giving them a very dingy appearance.

From other districts friends have supplied me with the following valuable records. Mr. Porritt has taken in a wood near Sheffield, *Macaria liturata* var. *nigrofulvata*, a variety supposed to be almost confined to Delamere Forest, in Cheshire. Mr. Fletcher, of Wakefield, reports *Acronycta leporina* and *Cymatophora fluctuosa* from his district. From Hull, Mr. Porter reports larvæ of *Cirrœdia xerampelina* and *Agrotis obscura* common at Spurn. The Rev. T. B. Eddrup reports *Sphinx convolvuli* from Horbury.

Much attention has been paid to the breeding of *Abraxas grossulariata* in a number of districts, and fine series of varieties resulted. The varieties *varleyata*, *hazeleighensis*, and *nigrosparsata* are a few of the named forms that have been reared, along with many other equally curious and striking varieties.

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Traité de Géologie: I. *Les Phénomènes géologiques*, par **Emile Haug**, professeur à la Faculté des Sciences de l'Université de Paris. Un vol. in-8° raisin (26c × 16c), de 540 pages, avec 195 *figures et cartes* et 71 *planches* de reproductions photographiques (Librairie Armand Colin, rue de Mézières, 5, Paris), broché. 12 fr. 50 [10-6d.].

For some time there has been an opening for a French treatise dealing with geological phenomena, which shall be intermediate between the elementary text-book and the more technical memoirs which are scattered in the proceedings of scientific societies, and are consequently not generally accessible. In the present work M. Emile Haug has supplied the want, and places upon permanent record an admirable series of essays suitable for the educated public.

M. Haug first describes the continental and ocean centres, which are the seats of phenomena of sedimentation. He assists us in the working out of the material which constitutes the crust of the earth, ending, by the continuous erosion (de-gradation) of terrestrial features (relief), in the formation of a level surface (pénéplaine), the last phase of the cycle of 'geological phenomena.'

Leaving these quite elementary ideas, the author places the reader in the presence of the most important problems of modern geology. The 'Traité de Géologie' offers on that account equal interest for the amateur and the professional geologist. Both will appreciate the copious bibliographical notes placed at the end of each chapter, which will guide the reader in making further researches.

The work is illustrated by 195 figures and plans, and 71 excellent plates of photographic reproductions; but the paper wrappers to the volume hardly survive the post. We cannot understand why our friends across the channel should so frequently place such valuable work in such flimsy covers.

British Mosses (2nd edition), by **Sir Edward Fry** (Witherby & Co., price 1/6), is an interesting little book in its way, and will be read with profit by beginners in the study of this charming group of plants. It draws attention to the position held by mosses in the classification of Cryptogams, and traces in detail the life-history of an ordinary moss, through its half-dozen stages—when the complete cycle is run. Instances are quoted of many that take a short cut across the circle, and dispense with one or more stages in their reproduction. A table is given of nine different methods of reproduction adopted by these plants. Attention is drawn to the remarkable variety of form and structure in the leaves and capsules. The booklet concludes with an outline of the important part these little plants at present play, and have played in the past, on the earth's surface. C. C.

THE FUNGUS FLORA OF MULGRAVE WOODS.

C. CROSSLAND, F.L.S.

THE eighteenth Annual Fungus Foray in connection with the Yorkshire Naturalists' Union was held September 19th-24th, at the picturesque sea-side village of Sandsend, for the investigation of Mulgrave Woods and adjoining pastures. All the members of the Mycological Committee attended, with two exceptions. Besides several other members of the Union interested in the subject, there were mycologists present from Cumberland, Derbyshire, Lincolnshire and Lancashire—twenty-two in all, including two ladies—Miss Decima Graham, Carlisle, and Miss Peniston, Leeds.

The Marquis of Normandy granted special permission to visit the parks and extensive woodlands on the Mulgrave estates. This kindness was supplemented by the Vicar of Lythe allowing the members the use of two commodius school-rooms at Sandsend, from Monday to Thursday. The use of these as general meeting-room and work-room very much facilitated the proceedings, and tended largely to bring about the successful results obtained. Excellent accommodation was secured at three boarding-houses, the school-rooms being used as headquarters.

The Committee made the most of these privileges and opportunities by having all the necessary books and appliances at hand for working out the finds.

The grand old Mulgrave Woods have long been favourite hunting grounds for Yorkshire mycologists. They are rich in vegetation, with the ground almost constantly moist; these conditions, accompanied by shade, encourage the growth of a great variety of fungi on decaying woody and herbaceous remains. Here fungi are not dependant on rainfall for the necessary amount of moisture; hence these woodlands at any time supply material for a mycological student. One could not help feeling what a vast field there is the year round for a local student, did one exist.

A preliminary run out was made on the Saturday afternoon, when it soon became evident that an abundant supply of these interesting organisms could be relied upon. Two or three species of Leptonia were plentiful in the pastures; this caused the most experienced member present to remark that when this happens, it is an almost certain sign that fungi generally are abundant in the woods, and so it proved.

The collecting was done in small parties so that more ground could be covered. The entrances to the woods being close at hand, no time was wasted in long drives or railway journeys, either at the beginning or ending of each day's investigations. In addition to the woods, there was plenty of pasture and meadowland to look over.

Each season, in all districts, there is a varying preponderance of a few families of agarics over others; some are plentiful, others scarce. This season at Mulgrave, many genera abounded notably *Tricholoma*, with twenty-four species found; *Mycena*, thirty-two; *Russula*, twenty-eight; *Cortinarius*, twenty-nine; *Lactarius*, twenty; *Philiota*, ten; *Inocybe*, thirteen; *Hygrophorus*, eighteen; and so on. Other genera were comparatively equally prevalent; even Jew's ear was abundant at Sandsend in a fence formed of aged elderberry trees. During the five days very much more material was met with than on any previous occasion. Among it were many common species that occur everywhere. Attention was given to all branches of the subject, more particularly, perhaps, to micro species.

At the rooms all the spacious table accommodation was occupied by named specimens left there for the benefit of the less-experienced students. One part of the interest lies in seeing the immense variety in size, shape, and colour displayed by the Agarics alone, when laid side by side.

On Monday evening Mr Massee gave an address on 'Economic Mycology,' dealing more especially with fungi that attack potato tubers, causing them to rot. One of these—a Thielavia, has been proved to have four distinct stages, each one of which, prior to the life-history of the fungus becoming fully known, was considered a distinct species. Mr. Massee's preliminary remarks appear on page 28. A special paper on the *Thiclavia*, with figure, will appear later.

The same evening Mr. Wager discoursed on 'The Development of Spores in the Basidiomycates,' tracing the fusion of a couple of nuclei into one, and its subsequent division into two or four, mostly four, in the young basidium. Later, or concurrently with the formation of the resultant nuclei, two or four projections (according to the species) spring from the upper part of the basidium. These develop into narrow cones (sterigmata), through each of which a nucleus passes upwards from the body of the basidium into a bulb-like formation at the tip of the sterigma, which eventually ripens into a spore.

On the Tuesday evening Mr. H. C. Hawley read a paper on 'New Fungi found in Lincolnshire,' and also referred to a number of interesting species found on a single decaying thistle at the Brafferton excursion last May.

Mr. J. W. H. Johnson read a paper on 'Fungi which have developed on material taken from polluted West Riding streams.'

Much interest was taken in the proceedings by the villagers, many of whom asked permission to come in to the exhibits room to see the collection of fungi on the tables. Several brought in specimens they themselves had collected to ask what they were. One or other of the members were always at hand to give them attention. Sensible utilitarian questions, such as 'Which are edible?' 'Is that good to eat?' etc. were put. To them, the edible aspect appealed the most; they could see no other recompense in the study of fungi. Their attitude reminded the writer of a friend of his, who, on seeing him overhauling a toadstool, asked if it was fit to eat; on the reply 'No, this one isn't' being given, the queriest says: 'What are you bothering with it for then?' This neatly sums up the common notion in respect to the study of toadstools. There were eighteen or twenty edible species on the tables, pointed out to the visitors. This side of the study was encouraged, but at the same time, the enquirers were advised to gather none to cook only well-marked species, about which there could be no possibility of mistake, such as the parasol mushroom, shaggy caps, ivory caps, blewits, etc. In June, it was noticed by the writer that St. George's mushroom—*Tricholma gambosum*—one of the best of edible toadstools, was very abundant in the fields.

At the close of the Foray, and after a few boxes of micro-material had been gone through by several members at home, the total determined reached 612 'species' and 12 vars. The analysis of the list shows that three—*Tricholoma carneolum*, *Pholiota sororia* and *Inocybe commixta*—are additions to the British Fungus Flora, twenty-seven new to the county, and seventy-six to vice county N.E. 256 are additions to the previously known fungus flora of Mulgrave Woods and adjoining pastures, which now amounts to 816 'species.'

It must be understood that many are but stages in the life-history of fungi that may have two or even three conditions. As these become better known throughout the county, a reduction in the numbers of previously supposed species will be necessary to get at a more accurate census of the fungi of the county.

The weather was all that could be desired for collecting purposes; rain began to fall on Tuesday morning, but soon cleared off. Several species of special interest were met with, one being *Bolbitius Boltoni* Fr., about which some uncertainty has been expressed as to whether it was a native of Britain (Mass. 'Brit. Fung. Flo.,' II., p. 205). It is quite distinct from *B. flavidus* in the depressed, darker disc and subadnate gills.

Sandsend proved a most suitable place for headquarters. being close to the ground to be investigated. The school-rooms were ideal places for general work and exhibit-rooms. An easily obtainable sea-side saunter afforded a charming break in the work for those who had the time and the inclination to indulge in this delightful and invigorating pastime. With us these were few; the woods and the work-room having the preference. A few, including Messrs. Massee and Clarke, were so absorbed in working out material brought in, that they did not get even into the woods.

At the business meeting on the Wednesday evening, a vote of thanks was heartily passed to Lord Normandy for leave to explore the estates, and to Vicar Harland, for allowing us the use of the school-rooms.

The Committee for the current year was re-elected Castle Howard is recommended to the Union as the place for the next foray—September 18th-23rd, 1909.

In the following bald list, those new to Britain are marked *, to Yorkshire, †. The remainder are all additions to the Mulgrave district, previous records having been strictly excluded.

Crucibulum vulgare.
Lycoperdon echinatum.
L. caelatum.
Bovista pusilla.

Lepiota rachodes.
L. carcharia.
† *L. glioderma.*
Armillaria ramentacea.
Tricholoma sejunctum.
T. ustale.
T. luridum.
† *T. squarrulosum.*
T. saponaceum.
T. sulphureum.
† *T. cerinum.*
T. ionides.
* *T. carneolum.*
T. gambosum (In June).
T. nudum.
T. saevum.
T. panæolum.

Tricholoma melolencum.
and Var. *porphyrolencum.*
T. humile.
T. sordidum.
T. paedidum.
† *Cliticybe comitalis.*
C. phyllophila.
C. pithyophila.
C. dealbata.
† *C. ampla .*
C. gigantea.
C. geotropa.
C. cyathiformis.
† *C. expallens.*
Collybia nummularia.
C. esculenta.
† *C. exsculpta.*
Mycena lineata.
M. flavo-alba.
M. gypsea.
M. pullata.
M. metata.
M. aetites.
M. amicta.
M. tenella.
M. rorida.
M. stylobates.
M. hiemalis.
M. setosa.
M. capillaris.
Omphalia hydrogramma.
Pleurotus ostreatus.
P. chioneus.
Entoloma prunuloides.
Leptonia solstitialis.
L. euchroa.
Nolanea pisciodora.
Eccilia rhodocylix.
Claudopus depluens.
† *Pholiota terrigena.*
P. ombrophila.
P. squarrosa var. *Mülleri.*
P. flammans.
P. tuberculosa.
* *P. sororia.*
† *Inocybe hirsuta.*
† *I. hæmacta.*
I. scaber.
I. Bongardii.
I. carpta.
I. scabella.
I. violacea-fusca.
* *I. commixta.*
Hebeloma glutinosum.
H. crustuliniforme var. *minor* Cke.
= *hiemale* Bres.
H. nudipes.
H. nauseosum.
Flammula gymnopodia.
F. gummosa.
F. alnicola.
F. sapinea.
F. ochrochlora.
Naucoria melinoides.
N. semiorbicularis.
N. tabacina.
N. temulenta.
N. erinacea.
Galera ovalis.
Tubaria furfuracea.
Var. *trigonophylla,*
Bolbitius Boltoni.
B. fragilis.
B. titubaus.
Cortinarius (Phleg.) *sebaceus.*
† *C.* (Phleg.) *variicolour.*
C. (Myxa.) *livido-ochraceus.*
C. (Ino.) *violaceus.*
C. (Derm.) *anomalus.*
† *C.* (Tela.) *macropus.*
† *C.* (Tela.) *bovinus.*
C. (Tela.) *rigidus.*
C. (Hygr.) *saturninus.*
C. (Hygr.) *castaneus.*
C. (Hygr.) *rigens.*
Agaricus sylvaticus.
A. campestris var. *hortensis.*
A. comptulus.
Stropharia inuncta.
S. coronilla.
S. merdaria.
Panæolus phalænarum.
Psathyra elata.
P. conopilea.
P. spadiceo grisea.
Coprinus soboliferus.
C. Gibbsii.
C. cordisporus.
Paxillus lepista.
† *P. extenuatus.*

Hygrophorus russo-coriaceus.
H. sciophanus.
† *H. mucronellus.*
H. nitratus.
Lactarius insulsus.
L. trivialis.
L. piperatus.
L. rufus.
L. fuliginosus.
L. mitissimus.
L. camphoratus.
L. cimicarius.
L. obliquus.
Russula drimeia.
† *R. atro-purpurea.*
R. Linnæi.
R. veternosa.
R. decolorans.
R. ochracea.
Marasmius prasiosmus .
M. fuscopurpureus.
† *M. Wynnei.*
M. candidus.
Panus conchatus.

Boletus crassus.
Polyporus dryadeus.
† *P. lacteus.*
Polystictus radiatus.
Fomes connatus.
Poria medulla-panis.
Merulius corium.

† *Hydnum sordidum.*
Radulum orbiculare.
Phlebia contorta.
Odontia fimbriata.

Solenia anomala. Var. *ochracea.*
Corticium calceum.
Hymenochæta fuliginosa.
H. corrugata.
Peniophora rosea.
Coniophora sulphurea.
C. puteana.

Clavaria formosa.
C. abietina.
C. incarnata.
C. dissipabilis.
C. ligula.

Typhula erythropus.
† *T. gracilis.*
Pistilaria quisquilarsi.
P. puberula.

Exidia recisa.
E. albida.
Næmatelia encephala.
Calocera stricta.

Melampsora epitea. On *Salix viminalis .*
M. circææ. On *Circæa lutetiana*
Coleosporium senecionis. On *Senecio vulgaris.*
Puccinia saniculæ. On *Sanicula europæa.*
P. obscura. Æcid. On *Bellis perennis*, abundant.
P. centaureæ. On *Centaurea nigra.*
P. lychnidearum. On *Lychnis diurna.*
P. glomerata. On *Senecio Jacobæa*
P. veronicarum. On *Veronica montana.*
Phragmidium violaceum. On *Rubus fruticosus.*
Triphragmium ulmariæ. Un *Spiræa ulmaria.*
Ustilago violacea.

Epichloe typhina.
Nectria cucurbitula.
N. aquifolii.
Hypomyces aurantius.
Xylaria polymorpha.
Ustulina vulgaris.
Hypoxylon multifome.
H. rubiginosum.
Phyllachora graminis.
Diatrype aspera.
Valsa ceratophora.
V. leiphæmia.
Eutypa Acharii.
† *E. scabrosa.*
Rosellinia pulveracea.
Sordaria minuta.
S. curvula.
Sporormia intermedia.
Raphidospora rubella.
R. acuminata.

Heptameria doliolum.
and Var. *conoidea.*
Pleospora meliloti.
Hypoderma virgultorum.
Gloniopsis curvata.
Hysterium pulicare.

Geoglossum glutinosum.
Mitrula olivacea.
Geopyxis cupularis.
Humaria carbonigena.
Lachnea coprinaria.
Dasyscypha ciliaris.
D. puberula.
Ciboria ochroleuca.
C. luteovirescens.
Helotium virgultorum.
H. herbarum.
H. epiphyllum.
H. immutabile.
H. alniellum.
Mollisia lignicola.
Ryparobius sexdecemsporus.
Ascophanus carneus.
A. argenteus.
A. ochraceus.
A. equinus.
Ascobolus immersus.
Saccobolus neglectus.
S. Kerverni.
Coryne urnalis.

Stictis radiata.
Phacidium multivalve.

Pilobolus Kleinii.
Pilaira anomala.
Spinellus fusiger.
Chætocladium Jonesii.
Piptocephalis [*repens* ?].
Peronospora grisea.

Sphæronemella fimicola.
† *Gloeosporium podograria.*

Cylindrium flavovirens.
Botrytis Tilletii.
† *Ovularia interstitialis.*
Ramularia calcea.
Periconia pycnospora.
Dendryphium comosum.
Stilbum fasciculatum.
Stysanus stemontes.
† *Tubercularia brassicæ.*
Bactridium flavum.
Fusarium roseum.
Epicoccum herbarum .

Clathrotychium rugulosum.
Perichæna depressa.
Arcyria cinerea.
Trichia fragilis.
T. chrysosperma.
Spumaria alba.

The members and friends present at the Foray have been supplied with a lithographed MS. copy of the complete list of the 612 'species' found on this occasion.

◆

Guide to the Specimens Illustrating the Races of Mankind (Anthropology) exhibited in the Department of Zoology, British Museum (Natural History). Illustrated by 16 figures. 32 pp., 1908. Price 4d.

This cheap handbook is the work of Mr. R. Lydekker, to whom has been entrusted the formation and arrangement of the series in its present form. The specimens illustrate Man solely from the zoological point of view, *i.e.*, his bodily structure and his geographical distribution. This subject has been much neglected in our national museum, and it is to be hoped that one result of this excellent little handbook will be that more help will be given to the authorities at South Kensington in the way of photographs and specimens.

Wild Life in a Southern Country, by **Richard Jefferies.** London: Thos. Nelson & Sons. 384 pp., 1/-

By an arrangement with Messrs. Smith, Elder & Co., Messrs. Nelson have produced this charming book as one of their shilling series. We feel that it is only necessary to draw our readers' attention to the low price at which the book can now be bought. It is well and artistically bound, the paper is good, the type clear, and there is a portrait of Jefferies. How it is possible to publish the volume at the price is a mystery.

ECONOMIC MYCOLOGY.

G. MASSEE, F.L.S.
Kew.

THE importance of the correct determination of species cannot be over-estimated. Whatever branch of botany is followed, its real value depends upon being quite certain as to the particular species dealt with. It has been clearly demonstrated that many of the apparent contradictions, so general in morphological and cytological dissertations, have originated in mistaking one species for another. *A* describes some peculiarities of structure or otherwise, present in a given species. *B* promptly follows in line to corroborate or refute the discovery, mistakes his species, and much argument follows. Notwithstanding the value of being able to correctly discriminate species, the fact that being able to do so fails to advance our knowledge in any way as bearing on the why and wherefore of such species, in other words, it does not touch the great problem concerning origin, affinities, etc.

As a body we are justly proud of our 'Fungus Flora of Yorkshire,' nevertheless, we must endeavour to maintain a correct sense of proportion, and not become slaves to list-making alone. We have now a thoroughly representative Fungus Flora of our county, and the addition of a few more or less, can make no difference from the standpoint of pure knowledge. The area of our county is too insignificant, as is also that of Great Britain, to be admitted as a factor in the distribution of Fungi over the globe.

Many Fungi are unique amongst plants in appearing under very different forms, during different periods of their development, the different forms often growing on different host-plants. These various forms were at one time considered as independent species, and received special names. Such names must remain until proof is forthcoming, that two or more such forms are in reality but stages in the life-cycle of one species. This is the kind of work that Yorkshire mycologists might attempt.

Between sixty and seventy thousand species of Fungi are known ; out of these it is certain that at least twenty five thousand so-called species are nothing more than phases of other higher forms. There are some hundreds of such in the list of names of Yorkshire Fungi, and it becomes the duty of Yorkshire mycologists to remove such from the list, by connecting them with the higher forms to which they belong. If such work cannot be carried out to finality, yet much can be done in the field and at home to suggest such affinities. All the Hyphomycetes, popularly known as moulds, are only forms, not entities, the same is true of the species of *Phoma*, *Cladosporium*, etc. If the substance on which these are growing is kept under observation, it may be for weeks, or even months, a second stage will follow the first. If this sequence of development is constantly repeated, it is highly probable—but not definite proof—that the two forms are related to each other. The definite proof consists in producing one stage from the spores produced by the alternate condition, a work of no insuperable difficulty.

During the summer our plane trees are often defoliated early in the season, owing to a minute fungus called *Glœosporium nervisequum*. In the spring a second form of the fungus appears on the wounds made by the first on the dead fallen leaves. This second form was known as *Pseudopeziza platani*. In consequence, the name *Glœosporium* is dropped, as it is known to be only a stage of the ascigerous *Pseudopeziza*.

Our object up to the present has been to obtain the greatest possible number of names of Fungi inhabiting Yorkshire. Our future ambition should be to reduce the list of names as much as possible, along the lines indicated above.

It may be thought that the Agarics are not included in the category of duplicate forms. This is not so, many so-called moulds are only the conidial forms of Agarics.*

◆

National Museum. The Danish Collection: Pre-historic Period. Guide for Visitors, Copenhagen, Prepared under the direction of **Dr. G. A. Auden.** 1908. [58 pp., not numbered].

The great majority of English visitors to the well-known Museum at Copenhagen are unfamiliar with the Danish language, and consequently do not reap the full benefit from a perusal of the unrivalled collections there exhibited. Recently a German edition of the guide-book appeared, dealing with the pre-historic section, and thanks to Dr. Auden, there is now an English edition. This is a concise account of the chief objects of interest in this rich institution, and the more important specimens are figured. Personally we should like to thank Dr. Auden for this further evidence of his practical interest in the study of Archæology; and, at the same time, we must record our regret that he has left the north, where his help was needed.

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* In addition to these useful and suggestive preliminary remarks, we hope shortly to print an account of the life-history of the *Thielavia*, with figure, by Mr. Massee.

FIELD NOTES.

BIRDS.

A Leach's Fork-tailed Petrel in very fair condition was shot at Barugh, near Barnsley, on October 17th, and is now in my possession. I intend to present it to the Barnsley Naturalists' Museum. The local occurrence of this species are all recorded in 'The Birds of Yorkshire,' by T. H. Nelson, the nearest being as follows:—One on the Don at Sprotborough, 1837; one on Sutton Common (near Askern); occasionally near Leeds; one in Halifax street, 16th December, 1831. In T. Lister's notes, besides the above, he gives one shot near Halifax (Varley's notes, 1874), but, if I understand Mr. Nelson rightly, this specimen was wrongly identified.—W. BARRACLOUGH, Barnsley, October 28th, 1908.

Honey Buzzard near Carlisle.—A Honey Buzzard was shot near Carlisle on the 23rd October. It has not been recorded during the last thirty years for Cumberland. It has been lent to the Carlisle Museum.—L. E. HOPE, Carlisle.

Fork-tailed Petrel at Carlisle.—On November 17th, a Fork-tailed Petrel was picked up at Stanwix, Carlisle. It was in an exhausted state and died a few hours after capture. The bird has been given to the Carlisle Museum and proved on dissection to be an immature female. It was in fairly good condition and not emaciated as might have been expected of a storm driven bird.—L. E. HOPE, Carlisle.

Eared Grebe on the Solway.—An example of the Eared Grebe was shot at Bowness on the Solway on December 3rd; a female in winter dress, but showing traces of nuptial dress on the neck and cheeks. This southern species rarely occurs on the Solway.—L. E. HOPE, Carlisle.

—:o:—

ENTOMOLOGY.

The Death's Head Moth near Carlisle.—The Death's Head Moth *A. atropos* has been taken commonly here during October. I have had four sent to the Museum as follows:—October 12th, ♀, Carlisle; October 13th, ♀, Abbey Town, Carlisle; October 15th, ♀, Shap (Westmorland); Newbiggin, Carlisle, October 14th, ♂. A female was also caught at Newbiggin, October 5th, and another female on October 10th, at Carlisle; also a female, October 10th, at Bowness-on-Solway.—L. E. HOPE, Carlisle.

REVIEWS AND BOOK NOTICES.

Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne. (N.S.) Vol. III., Pt. 1, 1908; pp. 1-222 + i-xxvii, Newcastle. 5/6.

We have received the volume for 1908 of the Transactions of this energetic Society, and it includes many valuable papers, several dealing with the more neglected branches of natural history. There are also several excellent illustrations. An appeal for funds for the publication of the Society's work resulted in over £245 being received. In addition to the Report for 1906-7, is a full report of Field Meetings, 1906, by Mr. R. Adamson; some miscellaneous notes by the Curator, Mr. E. Leonard Gill, from whose pen also appears an excellent appendix on 'The Hancock Museum and its History.' Miss M. V. Lebour gives a second instalment of her Memoirs on the Trematodes of the Northumberland Coast, and Mr. G. W. Temperley writes on 'The Northumberland Coast in September—an Ornithological Ramble.' There are two papers dealing with arachnida; Mr. A. Randell Jackson writes 'On some rare Arachnida captured during 1907,' and 'Allendale spiders' is by the Rev. J. E. Hull. Lt.-Col. C. H. E. Adamson gives part II. of his Catalogue of Butterflies collected in Burmah. A useful paper is by R. S. Bagnall, 'On some New Genera and Species of Thysanoptera.' There are also two valuable geological papers, viz., a 'Preliminary Note on a case of Thrust and Crush-Brecciation in the Magnesian Limestone, Co. Durham,' by Dr. D. Woolacott, and a lengthy and well-illustrated memoir on 'The Glacial Phenomena of the country between the Tyne and the Wansbeck.' Altogether, the volume is an ideal one for a provincial Society, and we should like to congratulate our Newcastle friends upon the way in which they are investigating the so-called 'unattractive' branches of natural history.

Report ol the Immigrations of Summer Residents in the Spring of 1907: also Notes on the Migratory Movements during the Autumn of 1906. By the Migration Committee of the British Ornithologists' Club, and edited by **Mr. W. R. Ogilvie-Grant.** Being Vol. XXII., Bull. B.O.C., 202 pp. and 31 maps. Whitherby & Co., 6s. net (paper cover).

This, the Third Annual Report, is to hand, and is on similar lines to its two predecessors, excepting that, in addition, it gives some short notes on the autumn migrants of 1906. This work should be read by all British students of bird migration, although, as we have previously pointed out, it is not quite satisfactory. In places, it certainly gives one the impression in the series of immigrations through England, as is illustrated by the maps, that chosen data of a species have been inserted so as to fit in with the first, second, or third immigrations as the case may be. We must again protest that the bare term 'Yorkshire' is insufficient for the purpose, and only confuses the Yorkshire student of bird migration, by irretrievably mixing many important and distinct bird movements; although we are pleased to observe that the few notes from the lighthouse at Spurn are given under 'Yorkshire Lights.' We would suggest that in future Reports, the terms 'West Yorkshire,' 'East Yorkshire,' and 'Yorkshire Coast' should be used; and the same rule would, most probably, apply to most sea-board counties. At the same time, the thanks of all students of bird migration should be accorded to this Committee, and more particularly to Mr. Bonhote, for his work in endeavouring to classify the data of so many important observers stationed all over England and Wales—Lincolnshire, (an important county in this respect), being very poorly represented. It may be of interest to non-believers in 'March Cuckoos,' that the Committee acknowledge the authenticity of no fewer than six reports of Cuckoos from the south-western counties from March 26th to March 31st.

H.B.B.

NORTHERN NEWS.

Dr. S. F. Harmer, F.R.S., of Cambridge, has been appointed keeper of Zoology at the British Museum, South Kensington.

We are glad to see that the Manchester Microscopical Society continues its excellent work in the way of lecturing, etc., in the surrounding district.

'*Eluma purpurascens*, a Woodlouse new to the British Isles' is figured and described by Denis R. Pack-Beresford in the 'Irish Naturalist' for December.

The Hon. W. Rothschild describes 'A new species of Bat Flea from Great Britain' in 'The Entomologist' for December; under the name *Nycteridopsylla longiceps*.

Dr. A. R. Dwerryhouse favours us with a copy of his Presidential Address to the Liverpool Geological Society, in which he deals with the modern hypotheses relating to the solar system.

Dr. Francis Galton has delivered an address to the Royal Society of Literature on 'Suggestions for improving the literary style of Scientific Memoirs. This has been largely circulated, and it is hoped will prove beneficial.

We are glad to see that the Millport Marine Station is issuing a 'Reprint Series,' No. I. of which has recently reached us. It is a paper 'on *Trichorhiza*, a new Hydroid Genus,' by E. S. Russell, and is reprinted from the Proceedings of the Zoological Society of London.

The Sixth Annual Report of the Advisory Committee of the Bradford Botanic Garden bears further evidence of the success of the gardens in Lister Park. Our Bradford friends are to be congratulated upon the earnestness with which they have carried out this work.

An interesting slab of Triassic sandstone from the Storeton Quarries has recently been placed on exhibition in the Liverpool Museum. It shews sun-cracks, ripple-marks, impressions of foot-prints, and illustrates almost all the varied traces of life of the Trias found in the district.

A yellow-browed Warbler was found dead in a hedge at North Cotes, Lincolnshire, on October 19th. This is the second record of the bird for the county ('British Birds,' December 1908). In the same journal, Mr. G. H. Caton Haigh records that he shot a Sabine's gull off Gramthorpe Haven, Lincolnshire, on September 28th.

The Annual Report of the Ipswich Museum, recently to hand, indicates that an extraordinary amount of good work has been accomplished during the past twelve months in connection with the re-arrangement and re-labelling of the specimens. The Ipswich Museum is also fortunate in securing much substantial help voluntarily.

We have received the Annual Report of the Huddersfield Naturalist and Photographic Society for 1907-8. This contains brief reports of the various recorders, which are worthy of preservation. The report is a twelve-page pamphlet, measuring $4\frac{3}{4} \times 5\frac{5}{8}$ inches—a very inconvenient size. It would have been much better if the ordinary 8vo size of previous reports had been followed.

Lieut-Col. Eschalaz has presented an admirable museum to the inhabitants of Waterloo, near Liverpool. It is largely devoted to British Birds. The donor points out that 'To shew one or two birds of each species in a case, would by no means convey the proper idea of these birds as they congregate on the edges of the cliffs; consequently, as many as are required to give a true representation of what they look like in their natural state are introduced.'

6 JAN. 1909

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THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

T. SHEPPARD, F.G.S., F.S.A.Scot.,

The Museum, Hull;

AND

T. W. WOODHEAD, Ph.D, .F.L.S.,

Technical College, Huddersfield.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

J. GILBERT BAKER, F.R.S. F.L.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S.,
T. H. NELSON, M.B.O.U.,
GEO. T. PORRITT, F.L.S., F.E.S.,
JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.
RILEY FORTUNE, F.Z.S.

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Yorkshire Naturalists' Union.

SECTION FOR VERTEBRATE ZOOLOGY.

(President—Mr. Riley Fortune, F.Z.S.).

Two Meetings of the above Section will be held at the Leeds Institute, Leeds, at 3 p.m. and at 6-30 p.m. respectively, on Saturday, February 13th, 1909.

Short lectures will be given as follows:—Dr. C. J. Patten, M.A., on 'Four Hours' Continuous Observations of the Feeding Habits of Richardson's Skua,' Mr. E. E. Gregory on 'The Pleistocene Vertebrate Remains of the West Riding,' Mr. A. Whitaker on 'Our British Bats' (illustrated by lantern-slides), and Dr. E. S. Stewart, M.B.O.U., 'A Recent Ornithological Expedition into Spain.'

The following gentlemen will exhibit lantern-slides:—Mr. Jasper Atkinson, Mr. Riley Fortune, F.Z.S., Mr. Oxley Grabham, M.A., M.B.O.U., Prof. C. J. Patten, M.D., Sc.D., Mr. Walter Wilson, and Mr. W. Hewett.

Agenda :—

At 3 p.m. there will be a meeting of the WILD BIRDS' AND EGGS' PROTECTION COMMITTEE. Members will then be at liberty to exhibit specimens, contribute notes, or ask questions. Dr. Stewart and Mr. Gregory will then give their papers.

The evening meeting (6-30 p.m.) will commence with Prof. Patten's lecture, and will be followed by Mr. Whitaker and Mr. Hewett, and concluded by the exhibition of lantern-slides.

All members and associates of the Yorkshire Naturalists' Union interested in Vertebrate Zoology are invited to attend, and to bring any notes, specimens, photographs, lantern-slides, etc.; and are requested to bring forward any matters of interest connected with the work of the Section, and to take part in any discussion.

Any member or associate is at liberty to introduce a friend.

Please Note.—As it is desired to make these meetings as representative as possible of the Yorkshire Naturalists' Union and of the County of Yorkshire—it is particularly requested that officials of the Affiliated Societies will draw the attention of their members to this notice.

Any further particulars can be obtained from the Honorary Secretary of the Yorkshire Naturalists' Union, at the Museum, Hull; from Mr. H. B. Booth, 'Ryhill,' Ben Rhydding; or from any of the officials of the Vertebrate Section.

NOTES AND COMMENTS.

THE PALÆONTOGRAPHICAL SOCIETY.

On the last day of the old year we received the volume of the Palæontographical Society for 1908, which contains many valuable monographs. Dr. A. Smith Woodward contributes part IV. of the 'Fossil Fishes of the English Chalk,' and includes *Elopopsis crassus* from Barton-on-Humber, described by Dr. Woodward in these pages in 1907. There is a further instalment of the reproductions of Sowerby's figures of Inferior Oolite Ammonites. Drs. Gertrude Elles and Ethel M. R. Wood contribute part VII. of the Monograph of British Graptolites. Mr. Philip Lake gives part III. of 'British Cambrian Trilobites.' Mr. Henry Woods contributes a further instalment of his 'Cretaceous Lamellibranchiata,' in which some Speeton Clay fossils are figured and described. These monographs are indispensable to workers, are wonderfully cheap, and we should like to support the appeal that is made for further subscribers. The subscription is one guinea per annum, and should be sent to Dr. Smith Woodward, at the British Museum (Natural History).

THE SOUTH EASTERN NATURALIST.

With the above title has been issued the 'Transactions of the South-Eastern Union of Scientific Societies for 1908,'* under the editorship of Mr. J. W. Tutt. Besides detailed reports on the various sections of the Union's work, it contains the Presidential Address of Sir Archibald Geikie, F.R.S., on 'The Weald;' 'Gilbert White and Sussex,' by W. H. Mullens; 'Spiders of the Hastings District,' by W. R. Butterfield and W. H. Bennett; 'Mediæval Timber Houses of Kent and Sussex,' by J. E. Ray; 'Hastings Castle,' by H. Sands; 'Notes on Dewponds,' by E. A. Martin; 'Some Local Marine Sponges.' by E. Counold; 'Birds exhibited at the Congress Museum,' by N. F. Ticehurst, and 'The Pleistocene Vertebrates of South-East England,' by W. J. Lewis Abbott. The volume is illustrated by a number of plates, and reflects the greatest credit upon our friends in south-east England.

---

* London: Elliot Stock. lxxi + 121 pp. 2/6 net.

HORNETS.

With reference to the query raised in these columns (page 53), as to whether the Hornet has been recorded for Yorkshire or not, we are glad to take the opportunity kindly afforded by Messrs. Cassell & Co., of reproducing an excellent illustration of male, queen and worker Hornets, which has appeared in their interesting 'Nature Book,' already referred to in these columns. The illustration will serve to show the quality and kind of those appearing in Messrs. Cassell's publication. It will also, we hope, enable our readers to keep a look out for the species, and thus add to the few localities for which it is known in the north.

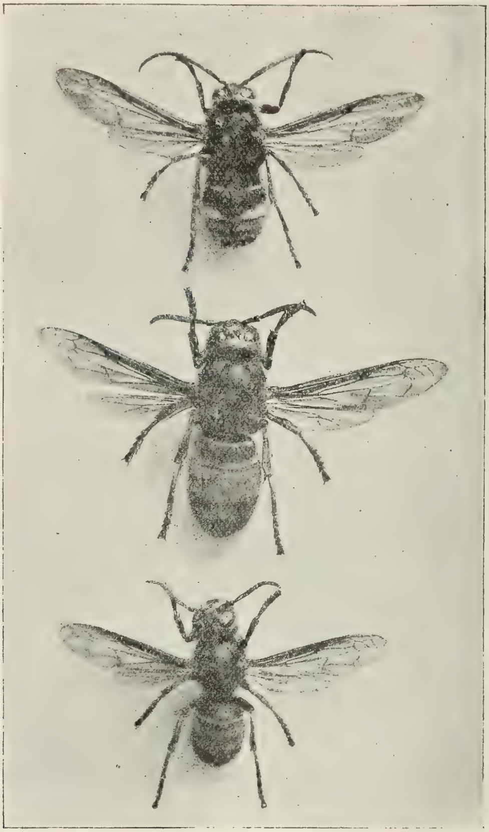


Photo by] **Hornets.** [*John J. Ward.*
(1. Male; 2. Queen; 3. Worker).

RAY SOCIETY'S PUBLICATIONS.*

The working zoologist has every reason to be thankful that such societies as the Ray Society are in a position to publish monographs on such a lavish scale as that before us. Otherwise the book could not be produced at a cost less than several times the price of the present volume, if produced at all. The Carnegie Trust has also given assistance for three years in regard to the artist, and section making, consequently the volume has been produced at a minimum of cost to the purchaser. The Society and author have also had the advantage of the knowledge and experience of Mr. John Hopkinson, the Secretary of the Ray Society, who has had much to do with the production of the work, and to whom the author duly acknowledges his great indebtedness.

BRITISH MARINE ANNELIDS

In dealing with the British Marine Annelids, the author has had an extremely difficult task, partly on account of the paucity of really reliable literature on the subject ; partly because of the difficulty in securing fresh material, and partly on account of the various classifications adopted by various authors. Prof. McIntosh does not feel warranted in adopting any of the recent classifications of the Polychæta, *e.g.*, that of Prof. Benham in the Cambridge Natural History : 'because none relieves the difficulties encountered in the older and more simple classification into errant and sedentary forms by Audouin and Edwards.' Some idea of the difficulties experienced in dealing with the literature upon the subject is shewn in the case of *Nephthys cæca,* where two of these large pages are devoted to a list of synonyms, varying in date from 1758 to 1906.

AND THEIR COLOURS.

The annelids dealt with in the present volume are surely amongst the most beautifully ornamented of the invertebrates, and, as the author points out, they vie with the gaudy tints of butterflies and birds, or the burnished splendour of beetles. This is strikingly borne out by the numerous coloured plates, upon which are shewn some of the most charming representations of these gaily coloured annelids that could possibly be imagined. We can safely say that we do not remember in recent years having seen anything like these for delicacy of colouring and minuteness of detail. We have recently had an opportunity of testing the plates by comparison with living examples of some of the species represented ; and the accuracy of the colouring and of the drawing was demonstrated.

---

* 'The British Annelids,' Vol. II., Part I. Polychæta, Nephthydidæ to Syllidæ, by Prof. W. C. McIntosh, M.D., F.R.S. 232 pp., plates. Issued to the members of the Ray Society. London : Dulau & Co., 25/- net.

A LANCASHIRE AND CHESHIRE NATURALISTS' UNION.

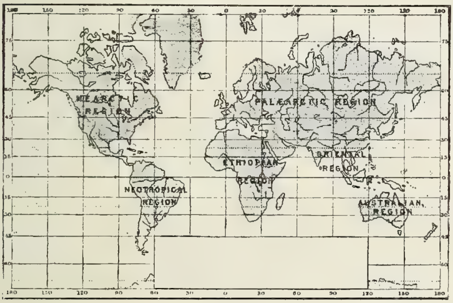
An effort is being made to form a Lancashire and Cheshire Union of Natural History Societies, on the lines of the Yorkshire Naturalists' Union, and towards this end Mr. E. Ranson, of 174 Willows Lane, Accrington, has issued a circular to various societies in the two counties, convening a meeting to be held in Manchester shortly. It is quite possible, however, that there are some societies with which he is not acquainted, and the secretaries of these, as well as anyone interested in the movement, are requested to communicate with Mr. Ranson on the matter. We also learn that it is proposed to revive the 'Lancashire Naturalist' in April, at 4d. per month. If the suggested Union becomes an accomplished fact, and the 'Lancashire Naturalist' becomes its official organ, it should have a longer lease of life than its predecessor.

LIVERPOOL GEOLOGISTS.

The Liverpool Geological Society has issued its volume of Proceedings for 1907-8, and it contains a useful record of local work, and two papers, the work of members, have reference to field work afar off. Dr. Dwerryhouse also contributes his Presidential Address to the Society. There are two important papers on the Trias, one on 'The Mineralogical Constitution of the Storeton Sandstone,' by J. Lomas ; and the other on 'Some Markings, other than Footprints, in the Keuper Sandstones and Marls,' by Mr. H. C. Beasley. Mr. Mellard Reade has watched the construction of a new Sewer Outfall, and as a result is able to give some useful notes on the Post-Glacial beds at Great Crosby ; with lists of foraminifera by Joseph Wright. Together with Mr. P. Holland, Mr. Reade gives some Analyses of Longmyndian Rocks. Mr. T. H. Cope writes some notes on some remarkable 'Comparisons in the Weathering of Basalt,' and Mr. Lomas writes on Marine Peat at Liverpool. A melancholy interest attaches to this volume. It is the last one in which the name of Mr. Joseph Lomas, who has done so much for the Society, and for geological science, will appear in the list of members. His recent lamentable death in a railway accident in Algeria, where he was carrying out some geological work, will be deplored by many besides his Liverpool colleagues.

LABELS SHEWING GEOGRAPHICAL DISTRIBUTION.

With the kind help of Mr. H. B. Browne, M.A., the collection of exotic Swallow-tail Butterflies in the Hull Museum is being arranged, and with each species is being shewn a small map of the world, on Mercator's projection, upon which the distribution of the species is indicated in red. In this way the localities in which the various forms occur can be seen at a glance. The maps are of the size here given, and have a place left in which the name of the specimen, or other information, can be inserted. It can, of course, be used for various other natural history objects. The map is really similar to the well-known distribution labels which are such a feature at the Manchester Museum, but are on a reduced scale. The publishers of this magazine are prepared to supply the maps to our readers, on a good white card. For particulars see our advertisement columns.



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Friends of the late Mr. Joseph Lomas will doubtless welcome the opportunity of subscribing to a memorial fund which is being raised for the benefit of his wife and children. As will be seen from another page in this issue, Mr. Lomas was killed in a railway accident in Algeria while on his way to study the rocks in the desert region of North Africa, this investigation being undertaken for a committee of the British Association. The devotion to scientific work which characterised Mr. Lomas meant the sacrifice of time and means that might otherwise have been more selfishly used. It is not surprising, therefore, to know that he was unable to make adequate provision for his wife and children. We hope there will be a generous response to the appeal which has just been issued by a committee which includes the names of many distinguished men of science. Subscriptions should be sent to the hon. treasurers, 'Lomas Memorial Fund,' Education Committee, 14 Sir Thomas Street, Liverpool.

THE GARGENY BREEDING IN EAST YORKSHIRE.

W. H. ST. QUINTIN, F.Z.S.,
Scampston, E. Yorks.

It is, I think, worth recording that in May last, an entirely wild pair of Gargeny Teal bred in this parish. The nest was under a wild rose bush, at the edge of a small willow garth, which is bordered by an open drain communicating with the river Derwent less than half a mile away. One of our farmers reported that a small duck was sitting there, and as it was in rather a dangerous place, my keeper lifted the eggs, thinking they were those of a Teal. The duck was flushed, but was not identified at the time. I am unfortunately unable to state the number of eggs, but I believe that there were eight. From these six young were reared, which turned out to be four drakes, and two ducks, and are now on the water here. I have had a single female Gargeny for several seasons, and this spring I provided her with a mate. On May 19th the latter was driven off by a wild drake of the same species, which suddenly appeared. He paired with the pinioned bird, and the alliance resulted in a nest, from which four young were hand reared. On May 27th the wild drake was beginning to go out of colour. By June 12th the pinioned duck was sitting, and her mate had disappeared. The wild bred ducklings were considerably older than the tame ones, and no doubt the full-winged drake was the father of the two broods, and when his first mate began to sit, he took to roving, and came across my tame bird, and paired with her.

◆

LEPIDOPTERA.

The Death's Head Moth at Rydal.—Mr. Hope's notes on the appearance of *A. atropos* around Carlisle coincide with mine for Rydal. Last year (1908) one was brought to me on October 10th, and the year before one on about October 15th. Both had come into houses.—Mary L. Armitt, Rydal.

—: o :—

ZOOPHYTES.

Zoophytes in the Humber.—With further reference to my note in 'The Naturalist' for December, I am now able to add *Gonothyrœa hyalina*, a species which has been identified for me by Mr. J. Ritchie, of the Edinborough Museum.—J. Thompson, Hull.

THE ROCK-SOIL METHOD AND *BALLOTA NIGRA* LINN. IN LINCOLNSHIRE.

REV. E. ADRIAN WOODRUFFE-PEACOCK, F.L.S., F.G.S., ETC.

THE single sheet, 3 by 3.75 inches, mode of collecting notes on every circumstance of plant growth, I named the Rock-Soil Method, in honour of Mr. Clement Reid for his book on "The Origin of the British Flora.' He practically deals with quaternary rock-soils of various ages in the same way that I work them when they have been exposed by elevation and modified again by denudation and plant growth.

As a typical instance of a rather difficult species to analyse, let us take *Ballota nigra*. It is pre-glacial at Pakefield[*] but rare. It was recorded for Lincolnshire by Rev. J. Dodsworth in 1836, Sir Charles Anderson in 1847, and H. C. Watson in 1851 ; and many times since. It is found in all our eighteen natural history divisions.

The following is its Rock-soil range, as far as it has yet been worked out on some 150 sheets :—

1. Blown Sand	9	14. Lower Lias Clay	3
2. Carstone	1	15. Marine Sand	3
3. Chalky Boulder Clay	12	16. Marlstone	1
4. Cornbrash	4	17. Old River Gravel	3
5. Estuarine Alluvium	9	18. Oxford Clay	4
6. Fen Gravel	6	19. Peat (Cultivated)	2
7. Freshwater Alluvium	1	20. Purple Boulder Clay	4
8. Hessle Boulder Clay	1	21. River Gravel	5
9. Hibaldstow Limestone	8	22. Sandy Glacial Gravel	39
10. Kimeridge Clay	2	23. Spilsby Sandstone	7
11. Kirton Limestone	2	24. Tealby Clay	1
12. Lincolnshire Limestone	10	25. Upper Chalk	2
13. Lower Chalk	1	26. Very Chalky Boulder Clay	1

It has been found *flore albo* on Fen Gravel, Peat, River Gravel, Sandy Glacial Gravel, Lincolnshire Limestone, and Spilsby Sandstone. In the form *foliis variegatis* on Hibaldstow and Kirton Limestone. Its flowering[†] range extends from May 30th to November 25th.

It is plain at once that *Ballota* is a lover of warm, open, and limy soils. When the sheets of notes are analysed, the following points come out. It is a hedge and ditch side species, but it seems to prefer a bank to the flat in the proportion of

---

[*] Journal Linnean Society, 1908, p. 218.

[*] By 'flowering' I mean when the stamens are shedding active pollen.

10 to 1. The sunny bank to the shady side of a road running east and west in nearly the same proportion. On sandy soils it seems to get away from the villages to a greater distance than on clays, but, to a certain extent, the rabbit may explain this. It extends from Cadney village along hedge and ditch banks on road sides as far as the Sandy Glacial Gravel extends in any direction. It is found in bushy ground in old quarries and gravel pits, and on the decaying mud capping of limestone walls. It is exterminated by stock in pasture, unless it is protected by *Urtica dioica* or by the fouling of the ground by rabbits. It is apparently never found in meadow. It is even sometimes eaten by cows when the much-loved *Lamium album* growing beside it remains untouched. It would seem all the same to be taken as a corrective or relish rather than as food. It may be rarely found far away from villages in the hedges of tilth. It is, however, found so rarely growing in open, that it would almost appear to be a shade species of bushy ground

Apply the following common Botanical Categories to it.

Followers of :—

1. Man.
2. Cultivation.
3. Commerce (the unusual flora of railways, canals and mills, etc., being so classed).

Frequenters of :—

4. Pasture.
5. Meadow.
6. Woodlands (open, close, old or new).
7. Hedges (distinguishing between roadside, grassland, and tilth hedges).
8. Roadsides (distinguishing those over grass or tilth).
9. Stream-banks (distinguishing between slow or rapid).
10. Moorlands (*i.e.*, where *Calluna, Erica, Pteris*, etc., are the predominant species).
11. Broken ground (whether natural, as on escarpments, stream-sides, or caused by man—but not for cultivation).
12. Lakes or ponds (noting inflows and outflows).
13. Streams (rapid or slow).
14. Sand-dunes (inland or marine).
15. Salt-marsh (natural or artificial).
16. Elevation (above Ordnance datum).

We find it may be classed as follows :—

1. For protection only.
4. Where protected only.
7. By roadside very common ; by grassland rare ; by tilth very rare.
8. Fairly common.
11. Quarries and gravel pits.
14. Marine, where there are comminuted shells, or the sea sand is slightly mixed with silt.
16. In Lincolnshire our greatest elevation is 550 feet only, and the soil pure chalk. *Ballota* under the circumstances, does not clearly find its altitude limit. In West Yorkshire, Mr. F. A. Lees now gives it a range of 0 to quite 600 feet, he writes to me.

To sum up, *Ballota* would appear to be areal* in Lincolnshire, but it can only survive when unconsciously protected by man, for its natural requirements, a bushy, open, limy, lightly stocked soil is practically not to be found in this country. That it is also local-areal in its soil requirements I cannot deny. That it is extra-areal I cannot believe from my present information, for what advantage does it obtain from the neighbourhood of villages, but protection from the feeding of stock ? It certainly bears no relation to true (1) followers of man, like *Cheledonium, Hyoscyamus, Parietaria*, etc., or of (2) Cultivation, or of (3) Commerce. I must, however, own the exact position of *Ballota* is most difficult to determine. We are not helped in the least by what Mr. S. T. Dunn says of it† :—‘ A native of the Mediterranean region and Western Asia. In England and most of Europe it is a weed of hedges and waste places, showing preference for the neighbourhood of human habitation.’ What does such writing tell us of the conditions of soil, stocking, etc., of everything we require to form an accurate estimate of the environmental conditions of *Ballota* abroad.

The true fact about it is, that it seems to be influenced as to its present place of growth by a cause I have never met with referred to in floras. England was an open country, practically wholly unenclosed till 1800, but as heavily stocked as the circumstances would then permit of ; or in other words, till the turnip and swede were introduced as field crops, and took their place in a recognised four years or longer rotation. As soon as huge flocks and herds were fed on roots during the winter, the whole ground could be systematically and regularly manured —then enclosure followed as a matter of course.

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* *Areal* means adapted to the environmental conditions of any given limit, field, village, county, or kingdom, without any suggestion of the original place or conditions of evolution, or method of reaching the locality referred to. *Local areal* means the same, limited by some condition or requirement of soil, moisture, stocking, etc. *Extra areal* means the species cannot, without *conscious* help on the part of man, survive in a limited local environment.

† ‘Alien Flora,’ p. 151.

Now *Ballota* is not truly confined to village hedges and banks but *to those suitable spots of the old enclosures,* which immediately surrounded villages, into which the stock from the open commons was driven for security at night. Even where these originally small paddocks, of two or three acres, have been thrown together into large fields, there is no difficulty to the trained eye in recognising them from the new enclosures by the traces of old fences or ditches on the green sward, or from their peculiar fertility. It was on them our forefathers expended their lime dressings to counteract the heavy fall of manure they received nightly from flocks and herds. Had they not used lime continually, these paddocks would, sooner or later, have been poisoned for grass growth. There is a well-known law in such cases. First a pasture grows quantity at the expense of quality, then the herbage grows acid, and as the insoluble manure accumulates in excess the herbage becomes like that surrounding rotting dung-hills. It is then a poison to stock. Steady liming corrects this decline in quality.

Now *Ballota* is a lime lover we know. The ' Flora of West Yorkshire ' settled that point, for Mr. F. A. Lees says :— ' Common on the Permian limestone, rare off it.' We know also that one part of lime has a powerful action on 10,000 parts by weight of an ordinary agricultural soil. Cannot the presence of *Ballota* be explained to a certain extent by the agricultural necessities of past conditions ? My notes suggest perfectly clearly that some such influence has been at work. It explains the presence of lime where *Ballota* is now found, whatever the rock-soil may consist of. It explains why it is never found in pasture unless protected, and how it would be soon exterminated in an unenclosed country outside the old village area, where stock we know from the manor records was never allowed to graze the hedge banks, road sides or ditches.*

* After I had gone to press with the typed copy of my *Ballota nigra* paper, I sent the original manuscript on to my friend Mr. F. A. Lees, who in turn sent it on to our mutual friend Canon W. Fowler.

[Mr. F. A. Lees writes, commenting on my *flore albo* records :—' There is a sub-species, *Ballota alba* Linn., most certainly introduced at some time.' I have no fault to find with this note, which had slipped me, but the nomenclature that underlies it is Linnean and not twentieth century. The *flore albo* forms of *Ballota* are no more 'off type' than the white *Viola odorata* L., which is commoner in Cadney than the usual type colour, yet is otherwise just the same. A return to such a system of nomenclature 'spoils' our chance of discovering the cause of these colour changes in plants. For instance, I have only once found the white-flowered form of *Cnicus lanceolatus* Willd., in my life. It was in an old pasture where *C. arvensis* Hoffm., and *C. palustris* Willd. were both found *flore albo*, in the same limited area too. There is a specimen in the county Herbarium at Lincoln of *Ononis spinosa* Linn., which was of the most lovely deep blue, sent in by the Rev. W. H. Daubney, while it was still quite fresh and brilliant in colour. It was the only plant growing in a large area of the type colour. Surely after the evidence of any ordinary plant collector's experience, or the production of the Shirley poppy, no one wants evidence that colour forms arise suddenly and continue indefinitely.

Vincent Bacon, F.R.S., Surgeon and Apothecary of Grantham, on October 1st, 1726, recorded in Martyn's Botanical Society of London, *Ononis spinosa flore albo* by the roadside from Ropsley to Boothby. It is found there to-day.* Patrick Blair, M.D., recorded *Epilobium hirsutum flore albo* for Bolingbroke in 1723; it is also there to-day † I have, however, direct proof of the 'spontaneity' of colour change in *Ballota nigra* under my own eyes. In 1906 a clump which had till then been typical in colour became white, and has remained so till now. Since I went to press Miss S. C. Stow has sent me a record which looks uncommonly like another case—'*Ballota nigra flore albo*, one specimen, wall bank, Ropsley village, on Lincolnshire Limestone.' There can be no doubt, as Canon Fowler suggests, that variegated leafage, such as is found in *Ballota*, arises in part from 'irregular nutrition, too soon wet and dry again.' White flowered or unusual colour forms, I believe, arise from a similar but not like cause.

Canon Fowler also suggests that plants, like *Ballota*, veritable 'children of the sun,' with an unusually long flowering range, may be 'triple brooded like some insects.' I have tried to think of everything in making notes, but have never thought of that point before, so cannot say for certain. I will keep some clumps under special observation next summer, to find out whether this is so. If this species is fertilised only by bees, its later flowers must be barren, which is not my experience. I regret to say I have no insect notes on *Ballota*. No doubt the Canon is right in suggesting that *Ballota* 'loves shelter from wind, and this is the reason it is a bushy ground or hedgeside species in our area.' Its exact position as a local-areal or extra-areal species can only be finally settled when its position in other counties has been as fully worked out as with us in Lincolnshire.

In giving illustrations of 'followers of man' in my last paper, I was only referring to Lincolnshire. *Parietaria*, for instance, I have proof is 'wind sown,' and 'water carried' here, but only very locally. I have plenty of proof it is purposely 'carried by man.' The following extract from 'Between Trent and Ancholme' ‡ is a fair case in point: 'The original Pellitory and wild Wall-flowers, upon the walls and everywhere, *were brought* as tiny seedlings from Thornton College ruins, and were associated at the time with Sir Walter's 'Edie Ochiltree, in the ruins of St. Ruth. 'Thae smell sweetest by night-time, thae flowers, and they're maist aye seen about ruined buildings . . . I'm thinking they'll be like mony folk's guid gifts, that often seem maist gracious in adversity.' *Parietaria*.

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* 'Naturalist,' 1898, p. 178.

† 'Naturalist,' 1894, p. 338, and 1897, p. 140.

‡ No author's name. Messrs. Jackson & Sons, Brigg, 1908, p. 35.

is clearly extra-areal in Lincolnshire, though no doubt areal in England among rocks, such as we do not possess in this county.

Mr. Clement Reid, F.R.S., also most kindly writes :—' This plant—*Ballota nigra* Linn. has always interested me, and I was a good deal surprised when it turned up in the Cromer Forest Bed. However, at that period the British climate was probably drier than now, though up till now very few of the prairie plants have been found.

' You may be interested to know that *Ballota* occurs not uncommonly in Roman Silchester ; and I think also in Roman Caerwent, though the specimen is too badly preserved for certainty. Silchester is on a gravel soil over Bagshot Sands ; but there is a great deal of lime-rubbish about the Roman town—cement, stucco, etc.

' I cannot say that I feel very sure that *Ballota* may not be one of the plants introduced in Roman times, for the only places where I found it away from habitations and cultivated land are on old shelly beaches, and by the shores of harbours, on steep banks. Still if the plant could live under other conditions than those you give I think that 1800 years is plenty of time for it to spread—the *Linarias* and *Veronicas* have no difficulty in spreading.

' In 1907 I found *Ballota* growing under exceptional conditions in Cornwall. There is a large field close to Wadebridge, attached to an old manor house, and out of cultivation for many years. The whole of this field is dotted with tufts of *Centaurea scabiosa* and *Ballota* mixed. This is so unusual that I tried to make out whether there was anything special in the geology to account for it ; but it seemed to be merely rough pasture on a thin soil overlying the ordinary non-calcareous slate of the country.

' However, there was formerly an enormous trade in shell sand for manure between Padstow and Wadebridge, and possibly this field may have been either heavily dressed, or have been one of the dumping places for heaps of sand. The field, however, if I remember rightly, must be at least two acres. It has sufficient slope to drain it well.'

I do not suppose for one moment that *Ballota*, or any species of like requirements, can have existed in Lincolnshire through glacial times. I doubt whether such plants could even exist in Cornwall, but am in no position to give an opinion. Mr. Clement Reid, in a letter says, ' It does not seem probable that *Ballota* can have lived through the glacial period in any part of the British Isles.' I believe the pre-glacial flora in Lincolnshire was wholly destroyed. The point is that what had once been could exist again, if the climate were approximately the same.

MOLLUSCA.

***Pisidium supinum* Schmidt. (= *P. conicum* Bandon), etc., in Lincolnshire.**—Whilst searching for Pisidia at the confluence of the river Brant with the Witham (div. 13 W.), on July 24th, 1908, I took the above shell, making a new record to the county list. Also on the 15th of the same month, at Skirbeck, Boston (div. 12), Mr. Birchnall and myself obtained some very characteristic forms of *Planorbis spirorbis* Müll. var. *leucostoma*. Mr. J. W. Taylor has been kind enough to verify the above specimens.—JOHN F. MUSHAM, Lincoln, December 23rd, 1908.

A YORKSHIRE BOTANIST.

RICHARD SPRUCE (1817-1893).

Had Spruce been consulted, he could not have desired a more fitting monument to his memory, than the two handsome volumes* now before us. And 'tis a great compliment to this Yorkshire botanist, and to Yorkshire, that a record of his life and work should be given to the world by Dr. Alfred Russel Wallace.

This memorial, though late in its appearance, is not the less welcome. It has a charm about it which recalls the substantial volumes of natural history travel of thirty or forty years ago.

Besides being a keen botanist, Spruce was a good 'all round' man, and recorded many interesting observations in other branches of knowledge. He also had a fine literary style, which makes a perusal of his notes a pleasure.

In his preface, Dr. Wallace writes : 'Shortly after Spruce's death, I offered to do what I could to put together a narrative of his travels from his journals and letters, if, on examination of the materials, it seemed possible to do so. His executor, Mr. M. B. Slater, was anxious that I should undertake the duties of a literary executor ; but, partly owing to both of us being fully occupied by our own affairs, it was only after a delay of eleven years that I was able to begin the preparation of the present volumes.' Since then, Dr. Wallace has spent three years in preparing the work for the press.

It is thus pleasing to find that another well-known and respected Yorkshire botanist, Mr. M. B. Slater (happily still with us), has had a hand in the preparation of this work. Spruce was Mr. Slater's first master, and Mr. Slater wrote : 'From him I got to know how to use a microscope, and thus got my first knowledge of the beauties of the mosses, and I can truly say their examination and study has been a source of great pleasure to me through life.' † Mr. Slater was fortunate in being a pupil of Spruce, and for some years previous to 1846, paid him weekly visits. Mr. Slater has favoured the writer with a sight of some of Spruce's letters,* each of which at once betrays his keen powers of observation. The first of them was written so long ago as 1847, when Spruce was preparing to issue his collections of Pyrenean Mosses and Hepaticæ. It is written in a small but fine hand, and, as with all his writing, most easy to read—not always a characteristic of a naturalist's handwriting! We quote the letter, as it not only gives information as to Spruce's methods, but probably also gives some indication of the way in which Mr. Slater first took up the study of mosses, with such good result:—

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* Notes of a Botanist on the Amazon and Andes, by Richard Spruce, edited by Alfred Russel Wallace, O.M., F.R.S., with a Biographical Introduction, Portrait, seventy-one illustrations, and seven maps. 2 Vols., 518 and 542 pages. London : MacMillan & Co. 21/- net.

† In the 'Introduction' to 'The Mosses and Hepaticæ of North Yorkshire,' in J. G. Baker's 'North Yorkshire,' 2nd ed., 1906, pp. 424-5.

> 'As you were kind enough to say that you could fasten down for me the specimens of a set of my *Musci Pyrenaici* I herewith send one for that purpose.
>
> I have gummed down a few of the topmost specimens, in order that you may judge how to do the rest. It is the best way to fasten down first the labels (by gumming them on the left side only), and afterwards the specimens. There are usually four specimens in each sheet of coarse paper, and when you have gummed these it will be advisable to apply a little pressure to them by means of sheets of drying-paper laid on them, or otherwise. Wherever you find *loose calyptræ* laid, they will require to be attached to the paper over the tops of any of the capsules.
>
> If you apply your lens to any of the species which are new to you, as you go along, you may thereby attain a very fair idea of their outside appearance (at least).
>
> To fasten down a set like this occupies me from two to three days, working at it all day. If I ask you to let me have it in a fortnight, you will, I suppose, easily finish it by taking an hour whenever you think you could not better employ it.'

Born at Ganthorpe, near Castle Howard, the son of a schoolmaster, Richard Spruce also began his career as a schoolmaster at Haxby, and was later at the Collegiate School at York, until it closed in 1844. From his earliest years, however, he developed a love for botany, and in 1837 he drew up a list of the flowering plants of the Malton district, comprising 485 species.† In 1841 he wrote his first paper on 'Three Days on the Yorkshire Moors,' which was printed in 'The Phytologist.' Subsequently numerous papers appeared from his pen, a complete list of which is given by Dr. Wallace.

Spruce's first long journey was to the Pyrenees, the published results of which brought him into contact with most of the leading botanists of his day. His greatest achievement in the way of publications, however, was his 'Hepaticæ of the Amazon and the Andes of Peru and Ecuador,' in 1885. This consisted of 600 closely-printed pages, and contained descriptions of over 700 species and varieties, mostly collected by himself, of which over 400 were new to the science.

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* One of these, dated 1879, the present writer is permitted to retain. It has a reference to 'The Naturalist.'

† This is in Mr. Slater's possession.

At home, Spruce accomplished much, not the least interesting being the discovery and identification of a new plant to the British Flora, *Carex paradoxa.* Amongst his many other works we notice one 'On Cephalozia: its sub-genera and its allied genera' (1882), this being the fore-runner of the large work just referred to. It contained 100 pages, and was printed in Malton. This is really a key to his arrangement of the Hepaticæ which is now generally followed.

The following extract, given by Dr. Wallace from one of Spruce's letters, is, like many others, worth quoting in these columns:—

> 'On our own moors I have far oftener seen *Odontoschisma Sphagni* growing on *Leucobryum glaucum* than on Sphagna. Now that the steam-plough is fast obliterating the small remnant of moors in the Vale of York, it is worth while recording something about the Leucobryum, as seen on Strensall Moor, five to six miles north of York. There it forms immense rounded hassocks, some of which in my youth were as much as three feet high; and although the ground whereon they grew is now drained and ploughed out, I am told that on another part of the moor there are still left a few hassocks about two feet high. When the late Mr. Wilson first saw them, thirty years ago, he took them at a distance for sheep; as he approached them he changed his mind for haycocks; but when he actually came up and saw what they were he was astonished, and declared he had never seen such gigantic moss-tufts elsewhere. During seven consecutive years that I saw them frequently, I could observe no sensible increase in height. The very slight annual outgrowth of the marginal branches is comparable to the outermost twigs of an old tree, and is almost or quite counterbalanced by the soft, imperfectly elastic mass incessantly decaying and settling down at the base; so that these tufts of Leucobryum may well be almost as secular as our Oaks or Elms; and some of them might even be coming into existence, if not so far back as when the warders of Bootham Bar and Monk Bar (the northern entrances to York) used to hear the wolves howling beneath their feet on the bleak winter nights, at least while the 'last wolf' was still prowling in the Forest of Galtres.'

In 1869 he wrote a letter in which he stated 'One day last week a dentist relieved me of four teeth, and I now belong to the genus Gymnostomum; but by the time you come over I hope to have developed a complete double peristome.'

As we know more of the life Spruce led, the more do we appreciate his worth. He was never wealthy, often very poor; and for a great part of his life was a martyr to an internal disease, which necessitated his reclining on a couch. During the last thirty years of his life, he lived some time at Welburn, and later in a small cottage at Coneysthorpe, near Malton; his 'world' being a sitting room, twelve feet square, and a bedroom of equally limited proportions. In this small room he was visited by many of the leading scientific men of his day, and from it he corresponded with the botanists of all parts of the globe.

Amongst the material left by Spruce when he died, was a large account book, in which had been carefully written eight chapters of 'Notes of a Botanist on the Amazon and Andes, being records of travel on the Amazon and its tributaries, the Trombetas, Rio Negro, Uaupés, Cosiquiari, Pacimoni, Huallaga, and Pastasa ; as also to the Cataracts of the Orinoco, along the eastern side of the Andes of Peru and Ecuador, and the shores of the Pacific, during the years 1849-1864.' Dr. Wallace informs us that with considerable condensation, this constitutes the first six chapters of the present work. The 'condensing,' however, has been achieved by omitting geographical and historical items of little general interest. Otherwise the narrative is exactly as Spruce left it, his north country or archaic words and expressions being preserved, though these were often 'queried' by the printer's reader. The value of the narrative has been increased by the insertion, in square brackets, of explanatory notes by Dr. A. Russel Wallace. This editor has also, for the convenience of non-botanical readers, placed lengthy passages of purely botanical, etc. nature, in smaller type, so that the general reader will readily know which portions to 'skip.' The illustrations are mostly from Spruce's own drawings. There is an excellent portrait of Spruce as a frontispiece, and a complete list of his works is also given, together with a biography.

Perhaps the greatest recommendation we can give to these two volumes is the following expression of its value by Dr. A. Russel Wallace, than whom we could have no better authority : 'I have myself so high an opinion of my friend's work, both literary and scientific, that I venture to think the present volumes will take their place among the most interesting and instructive books of the nineteenth century.'

And what could be more appropriate for these volumes, than the following well-known lines by Byron :—

To sit on rocks, to roam o'er flood and fell,
    To slowly pace the forest's shade and sheen ;
Where things that own no man's dominion dwell,
    And mortal foot hath ne'er or rarely been ;
To climb the trackless mountain all unseen,
    With the wild flocks that never need a fold ;
    Alone o'er crags and foaming falls to lean ;
    This is not solitude ; 'tis but to hold
Converse with Nature's charms, and view her stores unroll'd.

Sir Joseph Hooker stated, 'Spruce's monumental work "Hepaticæ Amazonicæ et Andinæ," is his crowning one that will ever live.'

T. S.

THE MIGRATORY MOVEMENTS OF CERTAIN SHORE-BIRDS AS OBSERVED ON THE DUBLIN COAST.*

C. J. PATTEN, M.A., M.D., Sc.D.

HAVING for several years made observations on the migratory movements of shore-birds on the Dublin coast, and having selected that coast this season as a holiday resort for the purpose of carrying out further research, it occurred to me that a paper dealing with the above subject might prove of interest to some members of the British Association, seeing that it assembles in the Irish Metropolis this summer.

After visiting many parts of the Irish sea-board, I may say that I think it would be hard to find a better observatory for the purpose of recording the arrivals and departures of numerous species of shore-birds than the coast of Dublin. By this, I mean not only Dublin coast proper, which bounds the estuary of the River Liffey, but also those extensive flat beaches north of the city which form a feature of the coast-line of the rest of the county.

While the greater part of this coast is prolific in bird-life during the Spring and Autumn migrations, nowhere have I been able to make better observations, or obtain a larger list of birds than along the flats of the north side of the estuary of the River Liffey, the further end of which is intersected longitudinally by a series of sand-dunes which, uncovered even at high water, form an island now connected with the road by a bridge. Hence, these sand-hills are accessible in all conditions of the tide, and with the surrounding beach, they constitute what is known as the 'North Bull.' The richness of the avi-fauna about here depends largely on the great extent and diversified nature of the soil, which yields an abundant and varied mass of food-stuffs, and also on the shelter secured by the Hill of Howth, which acts as a gigantic break-water against the fury of wind and wave. The sand-dunes, as they face Dollymount, are fringed with pasture-land, which, as it meets the sand, becomes damp and broken up into small grassy knolls, and intersected with gullies into which the tide flows. On these clumps many wading-birds congregate during high water. The beach inside the sand-dunes, *i.e.*, between the sand-hills and the road at Dollymount is composed of soft estuarine mud, thickly top-dressed with slimy green seaweed, and forms a feeding-ground for numbers of ‘ waders ’ On the far side of the sand-hills, a charming beach presents itself, where the sands, covered at full tide by the open sea, are ribbed and firm. Some shore-birds, notably the Sanderling, prefer this ground. Here, then, it is seen that within the confines of one area, which, when the tide is out, measures roughly three-miles in length by one in breadth, an excellent *natural habitat* is afforded.

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* Read at Section D., British Association, Dublin Meeting, September 2nd to 9th, 1908. An abstract of this paper will appear in the Official Report of the British Association, 1908.

Having already incorporated a considerable amount of information in my work on ‘ The Aquatic Birds of Great Britain and Ireland,’ published at the end of the year 1906, it seems unnecessary to overload this paper with statistics ; indeed, to avoid going over old ground, I purpose dealing only with a small number of species, which may be regarded of special interest, because of the increased information which I have been able to secure regarding their movements.

To give one an idea of the number of different kinds of *Limicoline* birds alone which are included in the avi-fauna of the North Bull, I here append a complete list, all of which I have observed :—

Great Plover (*Oedicnemus scolopax*)
Ringed Plover (*Aegialitis hiaticola*)
Golden Plover (*Charadrius pluvialis*)
Grey Plover (*Squatarola helvetica*)*
Lapwing (*Vanellus vulgaris*)
Turnstone (*Strepsilas interpres*)*
Oyster-catcher (*Hœmatopus ostralegus*)
Avocet (*Recurvirostra avocetta*)
Grey Phalarope (*Phalaropus fulicarius*)
Jack Snipe (*Gallinago gallinula*)
Common Snipe (*Gallinago coelestis*)
Dunlin (*Tringa alpina*)
Little Stint (*Tringa minuta*)*
Curlew-Sandpiper (*Tringa subarquata*)
Purple Sandpiper (*Tringa striata*)
Knot (*Tringa canutus*)
Sanderling (*Calidris arenaria*)*
Ruff (*Machetes pugnax*)
Common Sandpiper (*Totanus hypoleucus*)
Common Redshank (*Totanus calidris*)
Spotted Redshank (*Totanus fuscus*)
Greenshank (*Totanus canescens*)
Bar-tailed Godwit (*Limosa lapponica*)
Black-tailed Godwit (*Limosa belgica*)
Curlew (*Numenius arquata*)
Whimbrel (*Numenius phœopus*)

Only those species to which an asterisk is suffixed will be dealt with here.

I do not intend to touch upon Web-footed birds in this paper; but may say in passing, that of the orders *Anseres* and *Gaviœ*, large numbers of species are to be found in this vicinity.

GREY PLOVER (*Squaterola helvetica*).

Rather too much emphasis is laid on the fact that the Grey Plover is a noisy shore-bird, so much so, indeed, that frequently its presence is not sought in early autumn because its whistle is not heard. I believe that the adult birds, which arrive about the middle of October and later, are much more noisy than the immature birds. I have often watched, and crept quite close to immature Grey Plovers, which, on becoming aware of my near presence, flew away without a sound. The very tame immature birds which are occasionally met with are, as a rule, silent. From repeated observations I am of the opinion that flocks continue to arrive and move southward during September and early October, and that the numbers, chiefly late comers, which remain during the winter, are proportionately small. With regard to the apparent scarcity of the bird as a vernal migrant, I am not satisfied. Considering that it is on the whole more abundant during autumn on the east side of Ireland than on the west, one would expect to meet it on its return journey in greater numbers on the Dubin coast than have hitherto been recorded. That it does visit the Irish coast in considerable numbers in Spring is evident from Mr. Robert Warren's data (Ussher and Warren's 'Birds of Ireland,' pp. 256-257). The few birds which may be seen in late summer (August) in apparent nuptial or transitional plumage, are probably those which, not breeding, remained on our shores after their companions had travelled northward.

TURNSTONE (*Strepsilas interpres*).

I am now satisfied that the Turnstone, apparently in adult plumage is to be found regularly throughout the year along the Dublin coast. Nevertheless, though I have examined an adult female (procured on July 18th, 1900, by the late Mr. E. Williams) containing ripe ova, the inference can hardly be made that the bird was breeding in the locality. For it was without a mate, nor indeed have I as yet discovered this species in distinct pairs, and showing the signs of anxiety which one might expect if the nesting-site was being approached. However, from recent data afforded regarding its appearance in adult-like plumage at the height of the breeding season, it is not altogether improbable that we may yet claim this species as indigenous rather than merely migratory. From July to October this bird is plentiful on the North Bull, gathering in flocks of twenty to forty, which somewhat diminish in number in winter, due partly to scattering, and partly to the migration of some of the birds southward. It still continues plentiful as a vernal migrant during May and June.

LITTLE STINT (*Tringa minuta*).

Though I have regarded the Little Stint as an irregular autumnal visitor to the flats of Dublin Bay, not appearing during certain years ('Irish Naturalist,' 1898, p. 234, and *ibid.* 1899, p. 254), I have more recently felt inclined to modify somewhat this statement, and look upon the species as probably occurring every year in the locality in question. This is the view which I have ventured to give in my 'Aquatic Birds,' p. 295, regarding its appearance on the coast of Ireland generally, 'but in varying and limited numbers.' I must admit that I have not seen it for some seasons past, but then my recent visits have been of very brief duration, and I have not had opportunities as in former years of making almost daily visits during September, the month in which this species usually appears on the Dublin coast.

Granting, however, that one had these opportunities, it is an easy matter to overlook this bird, for its visits are only passing; indeed, I believe it is a matter of its being *here to-day and gone to-morrow* in most instances, so that it is obvious how many birds are altogether missed. Further, while it may consort with large flocks of Dunlins and other shore-birds on the open strand, yet, in my experience, it is also very partial to little grass patches and the edges of pools, where it occurs singly or in pairs. This, coupled with its great tameness when away from the company of more wary birds, gives the Merlin a greater chance of picking it up; indeed, the frequency with which this Falcon surprises and captures small shore-birds on the grass patches of the North Bull is remarkable; a greater proportion of birds losing their lives in this way, than when they are pursued in flocks over the open slob-land. Indeed, the presence of a flock seems to thwart the falcon, as may be seen by the time taken to single out the victim and capture it. And thirdly, numbers of shore-shooters frequent the North Bull during September, when the migrants are tame, and it is quite likely that Little Stints are shot occasionally which, with a bag full of Dunlins, are included as Sand-larks for to-morrow's pie.

Regarding the occurrences of this bird during the past two seasons, I have been informed that it has been seen, but no specimens were secured.

(*To be continued*).

WASPS AT WEST AYTON, YORKS.

REV. W. C. HEY, M.A.

OF the seven British species of Vespa, six occur in Yorkshire. It has often been stated that the Hornet (*V. crabro*) is a Yorkshire insect, but this mistake is probably due to the fact that the country people generally call the Tree-wasps, Hornets.* Of the six Yorkshire species of Vespa, five are more or less common at West Ayton, but I have failed so far to detect *V. austriaca*, an inquiline species, parasitic on *V. rufa*.

VESPA VULGARIS L.

The commonest wasp, which so often enters our houses in search of sweets. The queens were singularly abundant in April 1908, and often came to an old summer-house in my garden to gnaw wood for their nests.

VESPA GERMANICA Fab.

This wasp also often enters houses, and is very common. The queens, of which I observed an extraordinary quantity at West Ayton during the spring of 1908, are very large and handsome insects, and it is a beautiful and interesting sight to watch them performing their toilet in April sunshine. The most trustworthy distinction between *V. vulgaris* and *V. germanica* is in the shape of the yellow lines upon the thorax. In *vulgaris*, these lines are parallel-sided, in *germanica*, they have a decided tendency to flow outwards. The black markings on the clypeus and abdomen have been made too much of as specific distinctions.

VESPA RUFA L., sometimes called the ‘ Anchor-faced ’ wasp.

This wasp is fond of flowers, and was especially attached to species of *Centaurea* in my garden. It also affected *Cotoneaster*, *Symphoriocarpus*, and *Pyrus japonica*.

VESPA SYLVESTRIS Scop.

This species and *V. norvegica* are structurally very distinct from the three former species, as they possess a long cheek between the eye and the mandible. *V. sylvestris* seldom comes near houses. Its favourite plant is the Figwort. In the ‘ carrs ’ below Ayton is a ditch, thickly bordered with Figwort, and here this wasp abounded. In September, the male occurred on the same plant in Forge Valley. The clear yellow face of this species easily distinguishes it from *V. norvegica*, which is strongly and peculiarly marked with black on the clypeus.

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* *Vespa crabro*, Mr. W. D. Roebuck says (Victoria History of Yorkshire, vol. i., p. 217), has undoubtedly occurred in Yorkshire at York, near Wakefield, and at Beverley.—G.T.P.

Vespa norvegica Fab.

This wasp appears to be earlier than the other species. I have several times seen the queens abroad in my garden on sunny days in January. Last July the males were already abroad in the flowers of Cow-parsnips near Hutton Buscel Moor. I have not met with the males of any other species before September. This wasp is particularly fond of the flowers of the snowberry, and occurred on them in great numbers in the garden of a farmhouse on Seamer Moor. The globular nests of this species have several times been formed in my garden, in a gooseberry bush, in a pear tree, and under a seat.

My quest after the smaller wasps has not been very successful, as I can only record two species of *Odynerus*.

Odynerus parietum L.

On flowers of *Centaurea* and *Epilobium* in my garden, plentiful.

O. parietinus L.

Also in my garden about pear trees and snowberry, less common.

BIRDS.

White Starling at Ripley.—An interesting variety of the Starling was obtained at Ripley in April last. The plumage is quite white, the legs and bill light stone colour, and the eyes black.—R. Fortune.

Red Throated Diver at Grassington.—In December last a fine specimen of this species was obtained at Grassington, near Skipton, on the River Wharfe. It measured 2 ft. 2 in. in length, beak 2½ in., width (expanse of wing) 3 ft. 3 in., tarsus 3 in., weight 3 lbs. 9 oz.—Walter Wilson, Skipton-in-Craven, January 4th, 1909.

Fork Tailed Petrel near Doncaster.—I learn from Mr. W. E. Cox, of Sandall Grange, Doncaster, that a Fork Tailed Petrel was picked up on the high road by one of his men on Oct. 9th. It was kept alive for several days, being fed on fish and bread, the latter a very unsuitable food. It is interesting to have this record coming so close to the Barnsley one.—R. Fortune.

THE CHANGING DISTRIBUTION OF THE LONG-TAILED TITMOUSE IN THE WEST RIDING.*

HARRY B. BOOTH, M.B.O.U.

MESSRS. CLARKE AND ROEBUCK, in their 'Vertebrate Fauna of Yorkshire,' say that prior to 1881, the Long-tailed Titmouse was a resident, generally distributed and fairly common, most frequently seen in autumn and winter.' Mr. T. H. Nelson, in 'The Birds of Yorkshire,' 1907, says exactly the same thing, but adds—'during the breeding season it is rather locally distributed.' Mr. Nelson also gives the first reference to the bird in the county from North Bierley, Bradford; when, in the year 1713, Dr. Richardson described as that of the Gold-crest, a nest which was referable to the species under discussion. This is interesting because it refers to part of the district to which these notes chiefly apply, viz., the drainage area of the river Aire above Leeds, and the drainage area of the river Wharfe above Otley. Twenty years ago the Long-tailed Titmouse bred regularly in small numbers in both these areas. In 1889 I found nests both in upper Airedale and in upper Wharfedale, and it probably nested there until a few years later. It was during the year 1895 that it first occurred to me that this species appeared to be absent from the district during the breeding season; but reflection and discussion revealed the fact that neither birds nor nests had been noticed during the previous two or three seasons.

It is much easier to note the advent than the exit of a rather uncommon small bird; because in the latter case, one's attention and curiosity is at once aroused, but continual observations have to be made over a considerable area before it is possible to state definitely that the species has ceased to occur in the district. However, from that time forward, a better look-out was kept, with the result that not a single nest is known to have been found since then.

On May 17th, of 1907, however, two adult birds were seen in Bolton Woods, but they were not seen again, although the spot was carefully searched just after by Mr. Roose. In the same year, two birds with a young family were noticed in the Skipton Castle Woods, by Mr. W. Wilson, where they were presumed to have bred, but no signs of a nest could be discovered. So far as I am able to ascertain, these two reports are the only occurrences in the breeding season during at least the last fifteen years, notwithstanding the fact that a few years before the bird had nested annually in these districts. Neither has it favoured us much more with its presence during the autumn and winter. From the time of its ceasing to breed with us, its visits in the colder seasons have gradually become less frequent; until, at present, the Long-tailed Titmouse has almost ceased to visit us, and can be looked upon as a very uncommon bird in upper Airedale and in upper Wharfedale at any time of the year. It is difficult to assign any reason for this local change of habits and haunts, because in the neighbouring districts these birds are constant and not really uncommon. In the south of the Riding (south of Wakefield), they breed annually. In the north of the Riding they occur, and in April 1906, I was extremely surprised to see them so common near Sedbergh, where we found three of their nests in less than two hundred yards of one hedgerow. Mr. Fortune tells me that they still nest yearly in the Harrogate district, but he thinks in slightly decreasing numbers. I am informed that they are not uncommon to the east of Leeds.

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* Read at a recent meeting of the Vertebrate Section of the Yorkshire Naturalists' Union.

The reasons for such important, though local changes in the habits and distribution of a species during recent years, is worthy of investigation. My object in recording these facts is that this species may be kept under more careful observation all over the West Riding, or better still, all over the county; the notes compared, and the results analysed. It is only by such general and systematic observations that the true local status of any species can be obtained. I am confident that if Yorkshire ornithologists will make special notes of their observations of the different species, and compare them; that the distribution of the vertebrate fauna of our county will be worked out much more thoroughly than that of any other county.

P.S.—Since the above paper was read, Mr. Thomas Roose, of Bolton Abbey, informs me that the last nest to be found 'was in May 1895, in a hazel bush, nine feet from the ground, and not far from the old wooden bridge in Bolton Woods.' Thus a single nest has occurred a little more recently than is stated in the above notes. Mr. Roose also puts the following significant question, which can scarcely be taken as the sole cause, seeing that the same fact applies to the neighbouring districts, where the Long-tailed Titmouse still nests :—' Can these Long-tailed Tits have been driven from upper Wharfedale by the overwhelming numbers of the other members of the Tit family ? This is the only apparent reason for their disappearance that occurs to my mind, seeing that the others have increased so much.'

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The New Book of Animals. New and Revised Edition, by **Horace G. Groser.** London : Andrew Melrose. 326 pp., 6/- net.

This is a large book, and printed in good, bold type, and is very cheap at 6/-. It deals chiefly with the Kangaroo, Buffalo, Lion, Tiger, Elephant, Rhinoceros, Gorilla, and other animals of particular interest to boys and girls, for whom it would make an excellent gift-book. The text is not too technical, and the illustrations are both numerous and good.

The Country Home. Vol. I., 1908. Constable & Co., 380 pp., 5/- net.

This attractive volume contains the first six monthly parts of 'The Country Home,' already referred to in these pages, and in its present form, is exceedingly useful as a present. It contains numerous well-illustrated articles, those having natural history inclinations, being 'The Wild Cat,' 'The Flowers of Spring,' 'Galls and Gall Flies,' 'Nesting Boxes and Bird Tables,' 'The Stoat,' 'Snails,' etc.

The Moths of the British Isles. Second Series, by **Richard South, F.E.S.** (Wayside and Woodland Series). F. Warne & Co., 1908. Price 7/6.

We hail with pleasure the appearance of this volume, which, called 'Second Series,' is, in reality, the second and concluding volume of the 'Moths of the British Isles, or the third volume on the British Macro-Lepidoptera, the first one dealing with the Butterflies alone. As it is got up in the same way, and in precisely the same form as was the previous volume on the 'Moths,' little need be said in addition to what we wrote in the notice on it, which appeared in the 'Naturalist' of March 1908, p. 112; but the eulogium we passed on that volume can also be given to this. The volume before us treats of the remaining portion of the Noctuæ, followed by all the Geometræ, and finishing with the smaller groups of the 'Burnets,' 'Clearwings,' 'Swifts,' etc. Its ninety-six coloured plates contain natural size figures of 873 moths, and in addition there are sixty-three plates in black-and-white, containing 335 figures, chiefly of the eggs, larvæ, and pupæ. The plates in the two volumes on the 'Moths' contain the extraordinary number of 1208 figures, besides illustrations in the text pages. The black-and-white figures seem to be excellent throughout, and with a few exceptions, the coloured ones are equally good, though the 'greens' in the 'Emerald' moths are mostly too pale, and not sufficiently bright. The author, too, has evidently figured a specimen of a pale, but still brown-marked form of *Cidaria sufumata* as the ab. *porrittii*, whereas the types from which Robson described and named the variety were practically black and white only, and quite unlike this figure, though, no doubt, the extreme limit of the form illustrated. There are also one or two 'slips' in the letterpress, as on page 114, where *Skipton* Common is given as a locality for *Acidalia straminata*, instead of *Skipwith* Common. This is unfortunate, as we scarcely expect to see *straminata* at Skipton. Elsewhere in the volume, too, Skipwith is printed as Skipworth ; and there is clearly something wrong in the second paragraph on *Catocala fraxini* at page 79. But altogether, errors are remarkably few, and the three daintily elegant volumes together now form a cheap but reliable work, by means of which any young beginner ought to make progress in the study of the macro-lepidoptera far more rapidly than could have been done, even but a few years ago. G. T. P.

In Memoriam.

JOSEPH LOMAS.

By the death of Mr. Joseph Lomas in a railway accident at El Uchain, in Algeria, on December 17th, 1908, geology has

Yours sincerely
J. Lomas

lost one of its most energetic workers, and one of the most brilliant amongst the younger of its votaries.

Mr. Lomas commenced his scientific career as a student at the Normal School of Science, and on his attainment to the Associateship of that Institution, removed to Liverpool, where he was appointed to the post of Lecturer in Science by the Liverpool School Board.

Though primarily a geologist, Lomas by no means confined his attention to the study of the rocks. His early training under Huxley had given him a love for zoology, and in Liverpool, under the stimulating influence of Professor Herdman, to which Liverpool owes so much, he did good work on the Marine Polyzoa of the district.

It was during one of the dredging excursions, organised by Professor Herdman, for the investigation of the Fauna and Flora of Liverpool Bay, that the writer first became intimately acquainted with Mr. Lomas, and it was Lomas's influence that induced him to take up science as a profession.

About the time that he was engaged on the study of the polyzoa, he was also doing valuable work on the glacial deposits of the Liverpool district, at a time when the phenomena of the Pleistocene period were the subject of much discussion, and on the deposits forming on the floor of the Irish Sea, the investigation of the latter being the special duty allotted to him during the expeditions of the Liverpool Marine Biology Committee.

Soon after his arrival in Liverpool, Lomas joined the ranks of the Liverpool Geological Society. He rapidly gained the confidence of the older members, and in 1887 was elected a member of the Council, and filled the presidential chair from 1896 to 1898.

At the end of the present year the Society will celebrate the fiftieth year of its existence, and Lomas had been unanimously chosen as the member best fitted to act as President on that occasion.

For many years the investigation of the Triassic rocks, on which the City of Liverpool stands, has occupied the members of the Society, and in this work Lomas has of late taken an active part. It was largely due to him that the Committee of the British Association for the ' Investigation of the Fauna and Flora of the Trias of the British Isles " was formed, and at the time of his death he was on his way to investigate the desert phenomena in the neighbourhood of the Biskra Oasis, under a grant from the Association.

1909 February 1.

For a number of years he acted as one of the Secretaries of the Geological Section of the Association, and as Recorder since the year 1907.

Mr. Lomas was a Fellow of the Geological Society, and in 1897 was awarded the Lyell Fund; a member of the Geologists' Association, and of the Yorkshire Geological Society.

By his untimely death, not only has Geology lost an energetic and brilliant worker, but many will feel with the writer, that they have lost a friend whose cheerful good nature and unfailing courtesy rendered him dear to all who had the privilege of his acquaintance.

ARTHUR R. DWERRYHOUSE.

◆

FIELD NOTES.

MOLLUSCA.

Shells in British Barrows.—Referring to my notes in 'The Naturalist' for December, Mr. A. S. Kennard, F.G.S., has written to me expressing surprise that *Helicella cantiana* is found among the other shells from Birdsall Brow. He says:—'We have always looked upon it as a modern (*i.e.*, Roman or post Roman) introduction. I fancy that it must be an accidental occurrence. It is certainly always absent from pre-Roman beds.' The presence of this later species in a neighbouring barrow (67 Birdsall Brow) to that (65 Birdsall Brow), in which *Caecilianella acicula* is found, further confirms the view that these shells may have got into the barrows in other ways, at a later date than the interment, and that they may not be contemporaneous with the human remains. I do not wish to press this unduly, but think due weight should be given to their presence in coming to a definite conclusion on the point of the age of the shells in the barrows.—E. P. BLACKBURN, Gloucester.

Mollusca at Clapham.—The Conchological Section of the Yorkshire Naturalists' Union at Clapham in September, was represented by the undersigned, Attention was paid to a portion of the district not hitherto investigated, that lying eastwards of Clapham and about Austwick. Twenty-one species were noted, as follows:—

Arion ater
A. subfuscus
A. circumscriptus
A. hortensis
A. intermedius
Agriolimax agrestis
Hyalinia cellaria
H. alliaria
H. helvetica
H. crystallina
H. pura
Pyramidula rupestris
P. rotundata
Hygromia granulata
H. hispida
H. rufescens
Vallonia pulchella
Helicigona arbustorum
Cochlicopa lubrica
Pupa cylindracea
Clausilia bidentata
C. cravenensis.

making altogether six species of slugs, and sixteen of land-shells ; no fluviatile species were noted. The *Clausilia cravenensis* were brought by the geologists from the higher land, and Mr. R. Fowler Jones was the finder of *Arion ater* and *A. subfuscus.* Of *Agriolimax agrestis,* in addition to the type and var. *reticulata,* which abounded, one example was found of var. *lilacina.*—W. DENISON ROEBUCK, Leeds.

SOME NEW BOOKS.

GEOLOGY.

Stanford's Geological Atlas of Great Britain and Ireland (with plates of characteristic fossils) by **Horace B. Woodward, F.R.S., F.G.S.** Second edition. 190 pp. and 50 coloured geological maps and plates of fossils. 12/6 net.

In this compact little volume Mr. H. B. Woodward has succeeded in compressing an excellent summay of the geology of the British Isles. There is an admirable introduction referring to the general geological structure of the Islands, an account of the igneous, sedimentary and metamorphic rocks, a chapter on the mineral products, detailed descriptions of the geology of the various counties, descriptions of the features observable along the principal lines of railway, and an account of the geological structure of Ireland. There are also the clearly-coloured maps (with key), and tables of characteristic fossils.

In the present edition Mr. Woodward has included much relating to Ireland ; the maps have been brought up to date ; and in other ways the work has been made as useful as possible for its size. Mr. Woodward's name on the cover is quite a sufficient guarantee for the general accuracy and excellence of the publication. The amateur geologist will be particularly pleased with the clearness of the maps, and also with the fact that the principal collecting grounds are indicated.

Genesis of Metallic Ores and of the Rocks which enclose them, by **Brenton Symons.** London ; 'The Mining Journal.' 1908. xxxiii. + 494 pp.

In this work the author has been instigated by the desire to afford to young students a popularly written book, as devoid of technical expressions as the nature of the subject will permit. The author by no means confines himself to his favourite Cornwall, nor to the British Isles, but draws illustrations and examples from every district of the globe. The use of the word "geologic' amongst others, indicates the influence of America and American authors upon him. He also has his portrait as frontispiece, which is also usually a bad sign, no matter how good looking the author may be. The volume is divided into three 'books':—(1) Sedimentation of Rocks and Ores ; (2) Metamorphism of Strata ; and (3) Segregation of Metallic

Ores in Veins. These are further sub-divided into chapters, and each subject seems to be very exhaustively and thoroughly dealt with. There are also 154 illustrations (without the portrait), which help to make his points clearer. A perusal of the book leaves one with the impression that what Mr. Symons does not know about ores and veins and lodes and vadose solutions, and the 'oneness' of rocks is not worth knowing. The book would have been much improved in appearance if some less funereal type had been used for numbering of the pages, and if a much greater margin had been allowed. But then perhaps the author would not have been able to say :—

'Go *little* book, from this my solitude !
I cast thee on the waters—go thy ways ;
And if, as I believe, thy vein is good,
The world will find thee after many days.'

The Geology of Coal and Coal-Mining, by **Walcot Gibson, D.Sc., F.G.S.** London : Edward Arnold. 341 pp., 7/6 net.

This volume is the first of a series of works on economic geology by experienced geologists ; and if the rest in any way approaches the present one in the excellence of its matter, the clearness of its style, and the wealth of its illustrations, it will indeed be a magnificent series. Dr. Gibson's extensive experience in the British and South African Coalfields enables him to speak first-hand on the various questions discussed ; consequently the volume has a much greater proportion of original matter than would otherwise have been the case. After an introductory chapter, the author deals in detail with the varieties of coal, the chemical and physical characters ; coal as a rock, its formation and origin, distribution ; fossils as zonal indices, studies of exposed and concealed coalfields, etc. He then deals with the principal coalfields of Britain, and next refers at some length to the coalfields of various parts of the world. Perhaps one of the most important, as well as the most interesting parts of the book is that dealing with the value of fossils as zonal indices. Too much stress cannot possibly be attached to this side of the subject. Dr. Gibson's field-work enables him to speak with more than usual emphasis as to the value of zonal fossils, and his remarks on this subject should be read, marked, learned, and inwardly digested by every geologist, mining engineer, as well as by the increasingly large number of monied gentry who have an interest in coal which is other than scientific. This chapter is profusely illustrated by photographs, etc., of typical fossils. There is also a very good index. The publishers kindly enable us to reproduce one of the illustrations herewith.

***Glossopteris browniana* Brongt.** (Reduced).

An Introduction to Geology, by **W. B. Scott, Ph.D., LL.D.** New York: The MacMillan Company. 816 pp., 2nd edition, 22/- net.

This excellent volume is intended to serve the same purpose in America that Sir Archibald Geikie's well-known 'Class-book' does in this country, and there can be little doubt that Dr. Scott has rendered a great service to American geology in producing the book. That it is appreciated is shewn from the comparatively short time that has elapsed between the publication of the first and second editions. In the interval, the author has had the advantage of many suggestions, of a good proportion of which he has availed himself. A perusal of the pages, and of the beautiful series of illustrations, almost makes an English geologist envious of his American brothers in their wealth of geological phenomena on a grand scale. The chapters on 'The Atmosphere,' 'Running Water,' 'Snow and Ice,' 'Lakes,' etc., are particularly striking from the admirable illustrations which are given, many of which are such as could only have been taken from America. The chapters devoted to the later geological deposits and their extraordinary contents are illustrated in a style that would make an English writer hesitate. The volume has been prepared in an unusually substantial and careful manner, and will doubtless long be *the* book of its kind across the water. To English geologists it will prove of great worth for purposes of comparison.

Scientific Confirmations of Old Testament History, by **G. Frederick Wright, D.D., LL.D., etc.** Bibliotheca Sacra Co., Oberlin. Ohio, U.S.A. 422 pp., $2 net.

Prof. Wright's reputation as the leader of the school of glacialists in America; his brilliant books on 'The Ice Age in North America,' 'Man and the Glacial Period,' 'Greenland Ice Fields,' etc.; and his gift as a lecturer—a gift appreciated by many English geologists who have heard him—demand that any production from his pen should receive the careful consideration of the scientific world. In the present book, which has now been published some little time, Prof. Wright hopes to do 'something to re-establish confidence in the historical statements of the Old Testament, and, at the same time, of so unfolding the marvellous geological events of the post-Tertiary period, as to incite the general reader to a closer study of its significant and overwhelming facts, which invite investigation on every hand.'

Prof. Wright has visited the districts he describes, and whilst much of the matter dealt with in the volume does not come within the scope of this journal, we cannot but admire the ingenious way in which many of the extraordinary occurrences recorded in the Bible are here explained. The geologist will find much in the volume to interest him—particularly that part relating to the author's investigation of the loess of Northern China, a deposit which he carefully examined and here describes in detail. With regard to the 'Evidences of a Deluge in Europe,' we notice that Prof. Wright is a disciple of the late Prof. Prestwich. He accepts Prestwich's view of the origin of the rubble drift, and shelters himself behind Prestwich's great reputation; though at the same time he has been over much of the ground described by that author. There can, of course, be no question of the great floods covering the northern hemisphere at the close of the glacial period, and there is also evidence of a great destruction of animal species, whose remains are found with palæolithic man. Consequently the arguments brought forward by Prof. Wright should receive every consideration in dealing with this matter. In perusing this book, we naturally were anxious to see how far the well-known works of Sir Henry H. Howorth had influenced our author. Oddly enough, we can only find one reference to that writer, as follows:—'No doubt the greater part of the arguments for the Flood, drawn from the loess by Sir Henry Howorth and others, are explained by fuller knowledge of the irregularities produced by the slowly-melting ice-sheet.' We don't quite know whether Sir Henry would be altogether pleased with this interpretation of his three big books!

NORTHERN NEWS.

A ‘ fossilised mushroom ’ has been presented to the Beverley Museum.

We notice the Editor of a paper complains that for several days he could not put his hat on without pain !

We notice a recent writer on Yorkshire ornithology states that the Stone Curlew ‘ ran on all *fours*,’ with its large relative, the Great Bustard.

The Yorkshire Wild Birds’ and Eggs’ Protection Committee begs to acknowledge the receipt of two guineas from the Royal Society for the Protection of Birds.

A list of Lincolnshire heronries appears in ‘ The Zoologist ’ for December. In the same journal is figured a nest of the Short-eared Owl, with eight eggs ; ‘ the first ever recorded for Notts.’

Mr. W. E. Clarke contributes some notes on the Occurrence of Eversmann’s Warbler at Fair Isle ; an addition to the British Fauna, to the ‘ Annals of Scottish Natural History ’ for January.

The fine collection of Anglo-Saxon jewellery formed by the late Sir John Evans, and bequeathed to his son, has been presented by Dr. A. J. Evans to the Ashmolean Museum at Oxford.

A second edition of the well-known ‘ Borough ’ Guide to Hull has been called for (A. Brown & Sons, 2d.). It is prepared by Mr. T. Sheppard, and contains many improvements upon the previous edition of two years ago.

In describing the furs exposed for sale in a well-known emporium, the ‘ Western Mail ’ says :—‘ a really interesting study in natural history is afforded by the tigers, leopards, zebras, and monkeys, not to mention smaller animals, such as the *minx*.’

We regret to announce the decease of William Salkeld, on the 29th October, at Christchurch, N.Z., at the ripe age of seventy-six. He was a native of Cumberland, as his name would seem to indicate ; taxidermist by trade, and a skilled and experienced ornithologist.

Nature Study is evidently making headway, judging from the following answers selected from some boys’ recent examination papers :—‘ Africa is a very dark place, nearly covered with trees and animals ’ ; ‘ To kill a butterfly you pinch its borax ’ ; ‘ The bloodvessels are the veins, arteries, and artilleries ’ ; ‘ A ruminating animal is one that chews its cubs ’ ; ‘ The masculine of vixen is vicar.’

The December ‘ Entomologists’ Record ’ has one note that can be appreciated by a non-entomologist. An old gentleman, observing a boy’s very crude attempts at catching moths, advised him to go to the library and take out an elementary book on entomology, which would enable him to be more successful. A little while after, on seeing the same boy still persuing his old methods, he enquired why he had not read a book on the subject. ‘ I did,’ was the unexpected reply ; ‘ but it did not help me at all.’ The book he had read proved to be ‘ Advice to young moth-ers ! ’

Mr. W. E. L. Wattam sends the following Errata in the Index of ‘ The Naturalist ’ for 1908. The Fungi records *Coprinus cordisporus* Gibbs., n. sp., and *Humaria globosa-pulvinata*, n. sp., C. Crossland, indexed under ‘ Species and Varieties New to Britain,’ should have appeared under ‘ Species and Varieties New to Science.’ All the records of Arachnida, Flowering Plants, Fungi, and Mosses and Hepatics indexed under ‘ Species and Varieties New to Science,’ should have appeared under ‘ Species and Varieties New to Britain.’ All these records are, however, properly indexed under their respective County sub-headings. ‘ The record *Enicmus fungicola* near the end of “ Fungi, Yorks,” should come under “ Coleoptera, Yorks.” ’

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BRITISH NATURAL HISTORY

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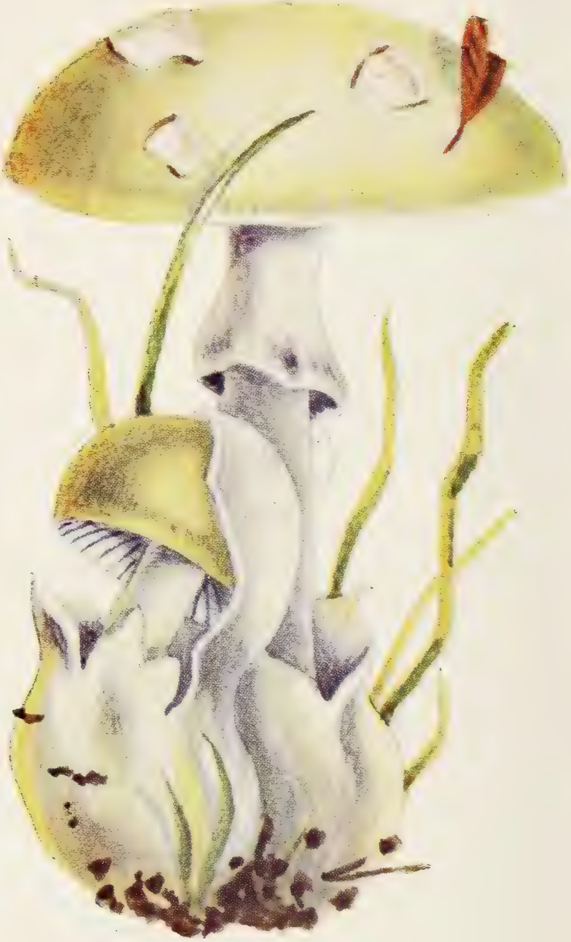


Poisonous Fungus (*Amanita phalloides* Fr.).

NOTES AND COMMENTS.

LARGE LARCH SAW-FLY IN THE LAKE DISTRICT.

In the December 'Journal of the Board of Agriculture,' Mr. C. Gordon Hewitt, of the University of Manchester, contributes a paper on the ravages of the large Larch Saw-Fly (*Nematus erichsonii*) in the Lake District. The life-history of the insect is dealt with, and the way in which it damages and eventually kills the larches is pointed out, and methods of prevention are given. A map of the Lake District accompanies the report, which indicates where the Saw-Fly is present, where the trees are rather badly attacked, and where the trees are very badly attacked, the last being in the vicinity of Bassenthwaite Lake, Buttermere and Thirlmere.

A POISONOUS FUNGUS.

In the November issue of the same Journal is an admirable illustration of *Amanita phalloides* Fr., one of the most dangerous of our poisonous fungi. This, by the kindness of the Controller of His Majesty's Stationery Department, and of the Secretary of the Board of Agriculture, we are kindly permitted to reproduce for the benefit of our readers (Plate I.). Many cases of poisoning by this fungus are on record, and in not a few instances the results have proved fatal. The species usually occurs in woods, and for this reason is not likely to be confounded with the common mushroom. The colour of the pileus varies from greenish to nearly white, according to the shade. 'The presence of a ring and a volva, together with the persistently white gills and pale yellow or greenish pileus are the more striking features of this fungus, and are sufficient to brand any specimen possessing them with the strongest suspicion.' With this form, at any rate, we do not recommend a certain Yorkshire mycologist's method of 'first trying 'em on the missus!'

THE FOOD OF BIRDS.

The Board of Agriculture has recently issued an important Supplement to its Journal, which we should recommend our readers to obtain. It is entitled 'The Food of some British Birds,' and is a record of the twenty years' observations on the contents of the crops of various birds, by Mr. Robert Newstead, of Liverpool. The work consists of nearly one hundred pages, and can be obtained for 4d., post free, from the Board of Agriculture, 4 Whitehall Place, S.W. In view of the allegations

1909 March 1

made against the birds by horticulturalists and others, this record of *facts* should be carefully perused. As the report points out, there are, on this subject, two points requiring special investigation. ‘ It is necessary to examine and tabulate the contents of the crops of certain birds in each month of the year, so that an opinion may be formed of the benefits or injuries caused by birds at all seasons. Secondly, it is necessary that some estimate should be made of the available food in the district where the birds were feeding when killed, in order that it may be decided whether the food discovered in the crops were selected from choice or from necessity.’

A THOUSAND CHESTER RECORDS.

In his introductory remarks, Mr. Newstead points out that the records of the materials upon which the memoir has been largely built are based upon 871 post-mortem examinations of the stomach contents, and the ‘ pellets ’ or ‘ castings ’ of 128 species of British birds. In the case of the Starling and a few other birds, these have been supplemented by a number of definite observations made in the field, bringing the total to considerably over 1100 records. From an entomological standpoint these are probably the most extensive yet compiled in this country, and as such, form a valuable contribution to our knowledge of the food of British birds, especially in relation to agriculture and horticulture. The majority of the material examined was collected in Cheshire, and as the conditions there are probably similar to those obtaining in other areas, it can be safely said that the records demonstrate the important part played by the majority of our British birds in checking the increase and lessening the ravages of garden and field pests.

NEW BOTANICAL FINDS.

Probably as an indirect result of the trio of new British plant lists, which were noticed at some length in our last volume, botanists in the north and centre of England appear to have had a ‘ fillip.’ Not only has *Selinum carvifolia* been turned up in Nottinghamshire, but a new British Broomrape (*Orobanche procera* Koch,) in West Yorks., and the larger chestnut-brown seeded Water-Blinks (with free flowers) in Merionethshire and elsewhere ; and Mr. Clement Reid led to this by detecting *both* sorts of seeds, shining and dull black, in the lacustrine leaf-bed deposits !

NEW SPIDERS.

The Rev. O. Pickard-Cambridge, M.A., F.R.S., has favoured us with a copy of his paper on 'New and Rare British Arachnida, noted and observed in 1907,' reprinted from 'The Proceedings of the Dorset Natural History and Antiquarian Field Club,' p. 161, 1908. This forms a valuable summary of the work accomplished among the Arachnida in Great Britain during 1907, and is illustrated by one plate. The species noted for the North of England are as follows:—*Ischnothyreus velox* Jackson (new to science), found in hot-houses at Alnwick, Northumberland, and at Chester; *Prosthesima lutetiana* L. Koch, from Port Erin, Isle of Man; *Hahnia pusilla* L. Koch, and *Theridion impressum*, L. Koch, from Delamere Forest, Cheshire; *Euryopis flavomaculata* C. L. Koch, from Newton Moss, Penrith; *Robertus neglectus* Camb., from the Hull District; *Leptyphantes angulata* Camb., from Northumberland; *Hilaira pervicax* J. E. Hull, from Whitfield, Northumberland; *Centromerus concinnus* Thorell, from Hull; *C. probabilis* sp. n. and *C. firmus* Camb., from Northumberland; *Maro minutus* Camb., from near Huddersfield; *Maro falconerii* from Delamere Forest, Cheshire; *Erigone spinosa* Camb., a species new to Britain, found on Saltend Common, near Hull (for a description of this species see the 'Naturalist,' 1908, p. 378-9); *E. longipalpis* Sund., from Kirkby, Lancashire, and the Humber Shore, near Hull; *E. arctica* from Cheshire; *Entelecara jacksonii* Camb., from Delamere; *Araeonus crassiceps* Westr., from Newton Moss, Penrith; *Panamomops bicuspis* from Hull. This report also contains some interesting information concerning species introduced into greenhouses, etc., with foreign plants.

DERBYSHIRE GLACIERS.

Under the suggestive title 'Observations of the Effects of Glaciers in Derwent Valley, Derbyshire,' by E. M. Wrench, M.V.O., F.R.C.S., we were recently tempted to peruse a paper in the Journal of the Manchester Geographical Society. In it we found much about the relationship between geology and geography, Classics in Education, Roman Roads, Fog, Kelts and Norsemen, but very little about ancient Derbyshire glaciers. Mr. Wrench, however, has found 'scoriated rocks,' which had been 'overlooked by Sir Archibald Geikie because his experience was confined to the effects of glacial action upon hard rocks, the granites of Scotland, and the slates of Wales.' It is apparent that Sir Archibald should take a few lessons in field geology, under the guidance of Mr. E. M. Wrench, M.V.O., F.R.C.S.

A GEOGRAPHICAL OBSERVATION.

Mr. Wrench has made yet another observation. He has traced the size and extent of the 'Derwent Glacier'; and located its marks. 'The flow of such a glacier in a valley of such easy gradient, would not be more than a few inches per day, or two hundred yards in a year, and if so, its progress would occupy several centuries, and *confirm Lord Avebury's calculation* of the duration of the Glacial Period *lasting one hundred and fifty thousand years!*' Doubtless Lord Avebury will be duly grateful for this striking confirmation of his theory.

GLACIERS AND PLACE-NAMES.

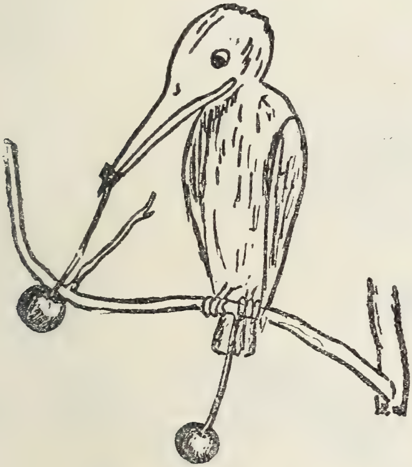
Mr. Wrench writes 'Lastly [thank heaven!] many place names are derived from the glacial features of the soil, such as *Tozenhurst*=Raggedwood, mentioned in Geological Survey as possibly glacial moraine; *Wormster*=Wormstall=Dragon's den. The River *Derwent,* clear water, from the clean *sweep* of the shale from the valley.' Quite so; and just in the same way the name *Wrench* must be of glacial origin, as it belongs to an 'M.V.O., F.R.C.S.'

THE NATIONAL TRUST.

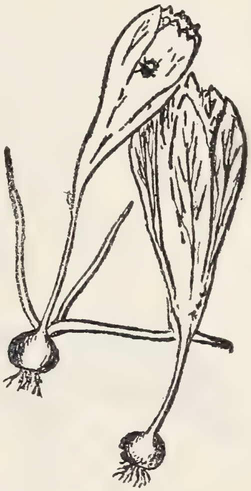
We have recently received the thirteenth Annual Report of the National Trust for Places of Historic Interest or Natural Beauty, and it is very pleasant reading. The land upon which the 'Grey Wethers' occur, near Marlborough, already referred to in these columns, has been secured to the nation for all time; Ludshott Common (542 acres) and the adjoining woodland (17½ acres) can be secured for £1800, and of this all but £150 has been subscribed. Other tracts of land are announced as gifts to the Trust, and are now preserved to the public for ever. In many instances these 'breathing-spaces' have been snatched from the hands of the speculative builder. The Report also contains a lengthy list of lands, historic buildings and monuments under its charge, from which it is apparent that its excellent work will be much more appreciated in the future by the public than it is to-day. The Secretary, Mr. Nigel Bond, of 25 Victoria Street, Westminster, S.W., will be glad to send copies of the Report to anyone interested, and to few better purposes can spare cash be placed than in supporting the Trust's efforts to keep our country as we now know and love it.

HOW TO TELL THE BIRDS FROM THE FLOWERS.

We have received two extraordinary publications, written by R. Williams Wood, one of which bears the above title. They shew to what an extent Nature Study has progressed in America ! At the top of each page is an illustration, and below this the description in verse. In order that our readers may see the nature of these, we reproduce one or two of them.



THE CROW.



THE CROCUS.

Some are unable, as you know,
To tell the Crocus from the Crow ;
The reason why is just because
They are not versed in Nature's laws.
The noisy cawing Crows all come,
Obedient to the Cro'custom,
A large Crow caw-cus to convoke,
You *never* hear the Crocus croak !

1909 March 1.

ANIMAL ANALOGUES*

is the title of the second little volume, and this starts off with—

THE BEE.

THE BEET.

THE BEETLE.

Good Mr. Darwin once contended
That Beetles were from Bees descended;
And as my pictures show, I think,
The Beet must be the missing link.
The Sugar-Beet and Honey Bee
Supply the Beetle's pedigree:
The family is now complete—
The Bee, the Beetle, and the Beet.

ANTS AND PHEASANTS.

THE ANT.

THE PHEAS-ANT.

The Ant is known by his ant-ennae,
Whereas the Phea-sant hasn't any,
And that is why he wears instead
A small red cap upon his head;
Without his Fez, indeed the Pheasant
Would be quite bald, and quite unpleasant.

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* Paul Elder & Co., San Francisco. 28 pp., 50 c. net.

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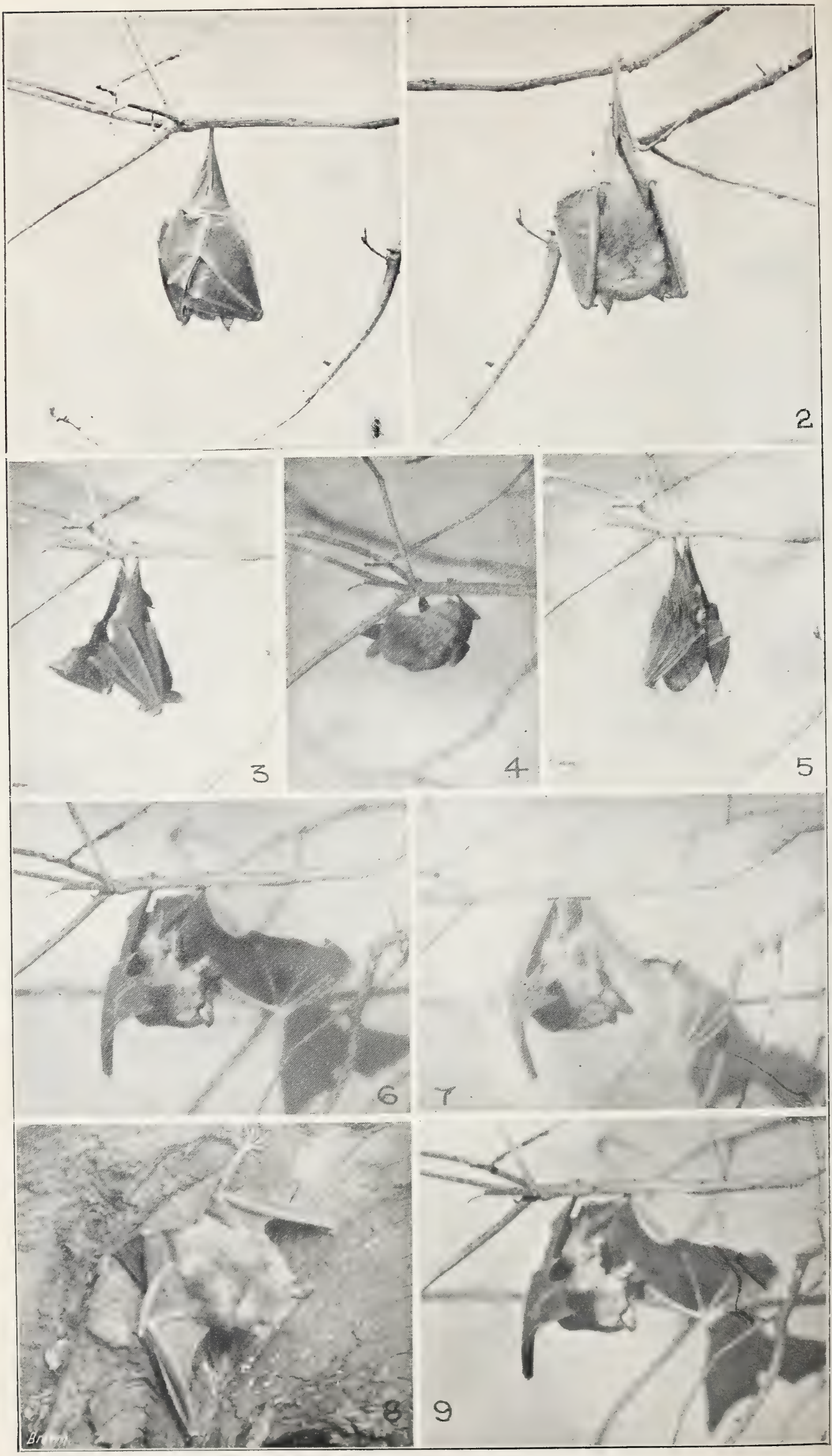

Greater Horse-shoe Bat (*R. ferrum-equinum*).

NOTES ON BATS.

(PLATES II. and III.).

ARTHUR WHITAKER,
Worsborough Bridge.

The phenomenally cold weather during April and early May of last year caused bats to remain in the torpid condition usual during hibernation for a longer period than they generally do, and May 27th was the first date on which I noticed these creatures flying in any numbers. The evening of that day was particularly warm and still, and in taking a walk round Rockley Dam, a sheet of water about a quarter-of-a-mile long, surrounded by woods, I found that many bats were on the wing. I netted several, all proving to be the common Pipistrelle (*P. pipistrellus*). One of these, a female, I kept alive, putting it in a small cage by itself. On the 10th of July it gave birth to a single young one, at 3-30 to 4 p.m., clinging head downwards to the cage side at the time, and receiving the young one in its right wing, which was held partially extended for the purpose. Unfortunately, the young bat did not live many days. All my observations in connection with it agree with those previously published,* but the period of gestation is now shown to be not less than 44 days.

On the 15th of July 1908, a box of bats from Wells was forwarded to me by rail. They had been caught two days previously, and I found the box contained one Lesser Horseshoe (*R. hipposiderus*) and four Greater Horseshoes (*R. ferrum-equinum*). One of the larger species was a female, and had given birth to a young male in transit. The latter was lying on the bottom of the box in a dying condition, but though this was evidently the case, it showed great tenacity to life, clinging to its mother very firmly when I put them together in a small cage. When she became restless and detached and left it, the young bat, though but a day old, hung by one foot from the top of the cage for over fifteen minutes, a favourite resting position for adult bats of this species (See Plate II., fig. 1), but surely an extremely exhausting one for a newly-born individual. The Lesser Horseshoe Bat died a few hours after it came into my possession. It was a female, and contained a fully developed embryo ready for extrusion,

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* 'Naturalist,' 1907, pp. 75, 76, etc.

One interesting fact relating to the young Horseshoe Bats is, that at birth, instead of being practically naked as are the young of the Vespertilionidæ, they are clothed with a very short, and soft, silky down, especially noticeable on the back, shoulders, and top of the head. Not only was this most conspicuous in the case of the newly-born Greater Horseshoe, but it was even plainly apparent in the embryo of the lesser species.

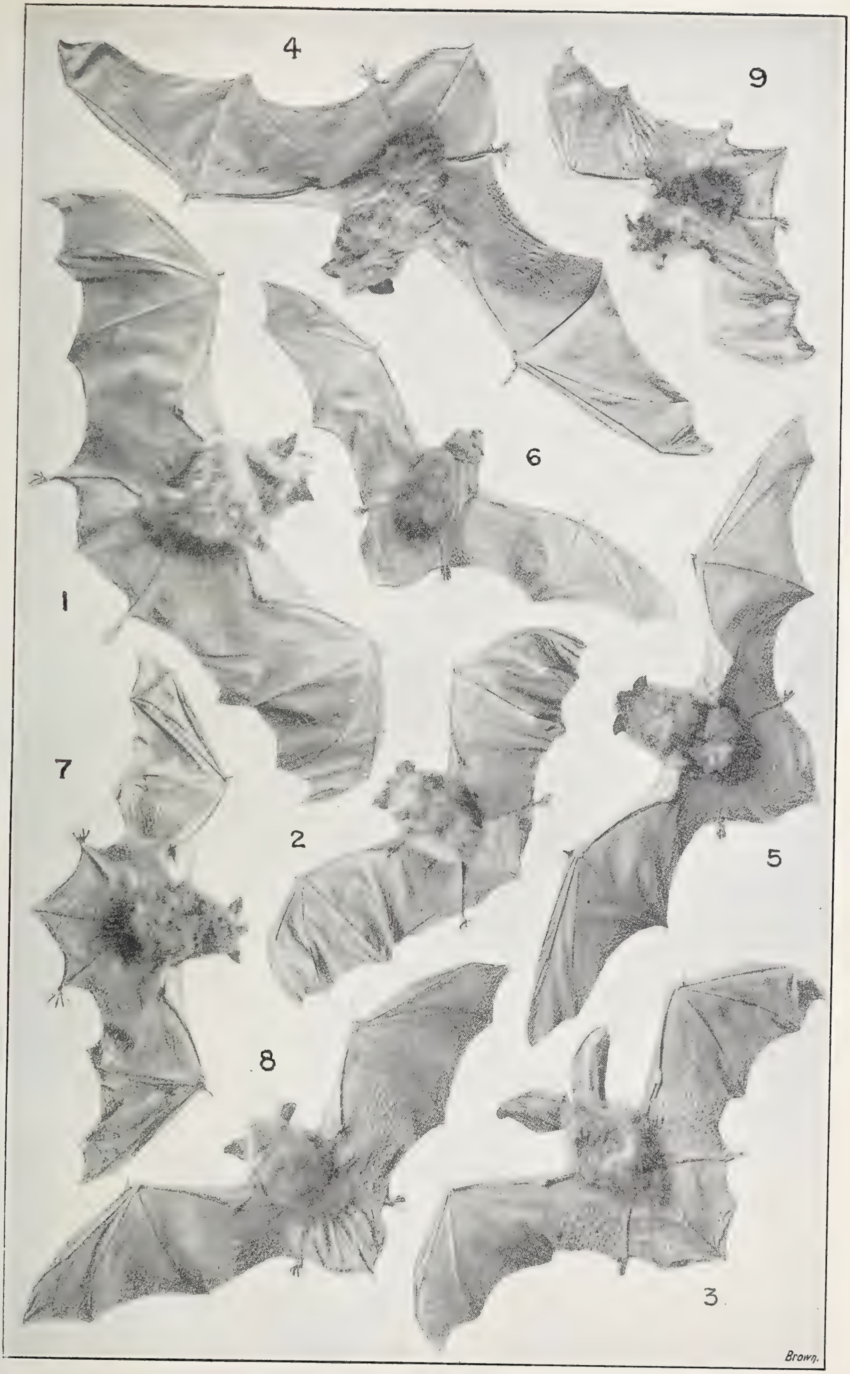
The call of the young Greater Horseshoe Bat was fairly loud, and consisted of several chirrups, repeated in quick succession, at intervals.

I kept two or three of the adult Greater Horseshoe Bats alive for some time, and most interesting pets I found them. Hanging head downwards, often by one leg only, they slept most of the time, suspended from a bar fixed across the top of their cage (a large meat safe). Sometimes they hung separately, but more often they slept all hanging together in a cluster. When this was done, a perfectly regular and almost exactly geometrical group was frequently formed.

Each of the trio held the perch with one leg only and hung facing inwards, so that the three faces were almost touching. Each had the left wing folded over its own breast, and beneath this tucked its disengaged leg, whilst with the right wing almost fully extended for the purpose, it did its share towards enclosing the whole group, which was by this means effectually screened and shielded from draughts, by the covering of three overlapping and encircling wings.

When living moths were put into their cage, the bats would catch them, but only seemed able to do so when the insects were in motion. An insect which kept quite still seemed perfectly safe; whilst on the other hand, the more rapid its movement, the more infallibly did one or other of the bats secure it by a sudden dart from its perch, seizing the insect in its mouth, and returning to the perch to eat it. Moths which were actually flying were caught much more easily than those which fluttered on the cage floor or sides.

These bats took to feeding on meal-worms readily, and like all other bats I have kept, no sooner tasted them than they developed so great a liking for them that I could only get them to take any more natural food with difficulty. They ate on an average five dozen meal-worms each per day, and would take these from my fingers, or forceps, as they hung from their



British Bats.

1. Greater Horseshoe; 2. Lesser Horseshoe; 3. Long-eared; 4. Noctule; 5. Hairy-Armed Bat; 6. Pipistrell; 7. Daubenton's; 8. Natterer's; 9. Whiskered Bat. ($\frac{1}{3}$ life size).

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perch, consuming them so rapidly that I had the greatest difficulty in keeping all three bats supplied when all were dining at the same time.

During the first few days of their captivity they always pressed any insect given them against the skin of the wing, (*i.e.*, the inter-brachial membrane) until they had secured a good grip of it. Later, when they had become more accustomed to meal-worms, they almost abandoned the practice, no doubt realising that it was unnecessary. Moths given to them were invariably so treated. This habit is excellently described in an interesting article on "The Greater Horseshoe Bat in Captivity," * written by that most accurate observer of bats, Mr. T. A. Coward. It is well illustrated on Plate II., Figs. 6, 7 and 9.

On July 27th the two Greater Horseshoe Bats then in my keeping had a most terrific fight sometime during the night, for in the morning I found one dead, the wings being torn and lacerated in several places, and the face and nostrils covered with blood The other bat had only bled slightly at the nostrils and was little the worse. I had not previously seen the slightest sign of ill-feeling between them.

The surviving bat escaped from its cage at dusk on July 28th, and although I saw it flying about the garden for some little time, I did not manage to re-capture it.

One evening, about a week later, my friend Mr. Armitage felt confident he saw a bat of this species flying at dusk at a considerable altitude over the field adjoining our garden. This supposition was confirmed in a rather remarkable manner, for on the 4th of September, more than five weeks after my pet had escaped, Mr. Armitage and I again saw it, when together. We were returning from a ramble, and at 9-15 p.m., more than an hour after dusk, we were surprised to see it busily engaged in catching moths, as they flew about some thistle flowers growing on the railway bank at Worsborough Bridge, and directly in the path of light which fell from the back window of the signal box at the level crossing.

We saw the bat several times between 9-15 and 10 o'clock, as it flew by, or hovered about in the light from the window. Its large size, pale colour, and delicate, fluttering flight, rendered it quite unmistakable, and though I again failed to re-capture it, it allowed us to approach within a couple of yards several times. Once or twice it appeared to almost settle on the ground. I was very much interested, and pleased to again see my lost pet, more than five weeks after its escape, yet within fifty yards of the place where I had kept it.

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* Vol. 52, Part II., Manchester Lit. and Phil. Society Memoirs.

Records of the occurrence of the Hairy-armed Bat (*P. leisleri*) in Yorkshire are few,* and any new ones are consequently of interest. I have recently had the pleasure of examining six preserved specimens, three of which were in the possession of Mr. G. Parkin of Wakefield, and the others in that of Mr. W. G. Chambers of Stanley. All were taken at the same time, *i.e.* towards the end of September 1902, at Oulton near Rothwell, where they were found in the roof of a cottage along with 'about forty others,' all 'apparently of the same species.' I was interested to find that of the six preserved specimens I examined, three were apparently males and three females. Probably all the bats in this large colony were Hairy-armed Bats; the six I examined were all undoubted examples of this species.

Every note I have been able to make with regard to this species and the nearly allied but far more abundant Noctule (*P. noctula*) confirms the opinion that the following peculiarity is habitual to them. Both species seem to gather in large colonies for hibernation, and these colonies are most often found occupying the roofs of buildings. They seem to comprise individuals of each sex in about equal numbers. In spring they split up into much smaller colonies, and usually take up arboreal quarters. These summer colonies will almost invariably be found to consist chiefly, if not entirely, of bats of one sex. Referring to my diary for confirmation of this, I find that every note I have made on these species, without a single exception, goes to support the statement. Take, for instance, the following :—

14/7/08.—Hole in beech tree, Rockley, Colony Noctules 10 M., 1 F.
5/9/06.—Hole in beech tree, Stainbrough, Colony Noctules, 7 F., 1 M.
22/8/06.—Hole in oak tree, near Barnsley, Colony Hairy-armed, 7 F.
20/7/06.—Hole in beech tree, Rockley, Colony Noctules, 8 M.
29/6/07.—Hole in beech, Rockley, Colony Noctules, 22 M., 2 F.
13/5/04.—Hole in beech, Stainbrough, Hairy-armed Bats, 2 M.

These are only some of many notes, all indicative of the same habits. To multiply instances is unnecessary and would only occupy too much space.

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* See my notes on this species in 'Naturalist,' 1907, pp. 384, 385, etc.

In support of my opinion that the winter colonies are usually larger in buildings, and of both sexes, I may say that all the usual arboreal quarters I know, which are made use of in summer, are deserted during the winter months, and that a colony apparently always occupies a certain church tower at Worsborough Dale in winter, for great numbers of Noctules may be seen flying in its immediate vicinity in early spring and late autumn, but not in summer.

The colony of Hairy-armed Bats found at Oulton in a cottage roof in late autumn of 1902, and the large colony of Noctules occupying a house roof at King's Lynn, Norfolk, for many successive winters and springs, as recorded in a note by Mr. H. B. Booth,* consisted of individuals of both sexes 'in about equal proportions.'

There is scope for much interesting speculation as to the peculiarly erratic manner in which gregarious instincts are displayed in our British bats. One cannot see that it is at all necessary for their mutual protection, for they seem to have hardly any enemies. Apparently it is not for warmth. On cold, damp days, I have several times found Noctules occupying lonely quarters, whilst on September 1st, 1906, one of the hottest days I ever remember, Mr. Armitage and I examined a colony of eleven Noctules in the hole of a tree in Stainbrough Park, and found them packed in a solid cluster in one corner of their den, actually wet with perspiration. The thermometer at the time stood at 94° in the shade and 110° in the sun.

I have found the Long-eared Bat (*Plecotus auritus*) scores of times, both in summer and winter, resting singly in cold, damp chinks of tunnels and stonework, yet if the same species be searched for in August, usually the hottest month of the year, small colonies of six to ten, or more, will be almost invariably found squeezed together in one hole. August and early September seem to be the only time when bats of this species are gregarious.

Of Natterer's Bat (*M. nattereri*), Daubenton's Bat (*M. daubentoni*), and the Whiskered Bat (*M. mystacinus*), I have always found odd specimens, even in mid-winter, though large colonies of each of these species have been recorded. The same thing applies to the Pipistrelle. I have found odd ones even in winter, and on the other hand, I have found colonies consisting of not merely scores, but hundreds of individuals.

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* 'Zoologist' 1905, p. 427.

The explanation of these spasmodic and periodic instincts towards gregariousness may be arrived at by the collection of a large number of exact observations; even then it may have to remain a mystery.

One difficulty in solving such problems seems to me to be so often overlooked, that I cannot refrain from mentioning it. Any characteristic, whether of structure or habit, in any creature, acquired for a particular purpose by means of natural selection, is not likely to be a benefit to the species as a whole. Take, for instance, any example of protective colouration: to whatever degree of perfection it may be developed, such development would cease the instant that it became perfectly protective. This implies that up to the very last and most minute phase of the acquirement, the enemy developes equally in cunning and perception. Reversion always has a tendency to take place in a plastic organism, and a moment's reflection only is necessary to show that no creature can exhibit protective colouration, except to the exact degree which its enemies are capable of seeing through. The degree in which it possesses protective colouration is the measure of the enemies' keenness of observation, and can only be in proportion thereto. The two things are two forces acting upon one another, and must be in equilibrium. A realisation of this fact is necessary to properly appreciate the difficulty of solving many problems in natural history, because it shows how a habit or characteristic may be acquired for a specific purpose, and yet we may not be able to see that it is fulfilling that purpose in any way. What we do see is only the present position of two or more creatures, each striving to gain an advantage over the other in the struggle for life. The temporary advantage gained by either will not be beneficial to the species as a species, but only to those individuals who possess it more than the average of their contemporaries.

On Plate III. are reproduced photographs of nine species of bats found in this country, taken from some of my preserved specimens, by Mr. Walter Wilson, for reproduction here. Nos. 1 and 2 are from bats taken in Somersetshire; all the others are from Yorkshire specimens.

The Greater Horseshoe Bat shown in different positions on Plate II., was one of my pets which I lent for a time to Mr. Riley Fortune, who kindly took these photographs of it. Figs. 1 and 2 are ventral and dorsal views of the bat, sleeping.

Fig. 5 shows the bat waking up. Figs. 6, 7, and 9 show the bat after seizing a meal-worm, in the act of pressing it against the inter-brachial membrane, in order to secure a firm grip of it. Fig. 3 shows the bat eating a meal-worm. Fig. 4 lifting up the body (by bending the legs) and rubbing the lips and mouth against its perch after eating. Fig. 8 shows how the Horseshoe Bats hold the tail curved upwards over the back, instead of downwards under the body as do the Vespertilionidæ.

◆

A History of Horncastle, by **James Conway Walter.** Horncastle: W. K. Morton & Sons. 218 pp., price 5/-.

Our contributor, the Rev. J. Conway Walter, may fairly claim to be the historian of the Horncastle district. From time to time he has placed on record notes dealing with the history of his neighbourhood. His latest book, now before us, may be taken as his best. In eleven chapters he deals with the early history of the place, the records from the Norman Conquest; the various churches, chapels, educational institutions, etc., railways, canals, institutes, worthies, oddities, and public houses. As an appendix there are descriptions of fourteen adjoining villages. There is no doubt that most, if not all in this volume, was well worth recording, and will be perhaps more appreciated in the future than now; but personally, we should have preferred to have seen much more relating to Roman Horncastle, and Horncastle of its earlier days—a subject which we feel sure the author could have enlarged upon. For instance, we should have liked to have seen a fuller account of the Roman urns referred to in the footnote on page 7—objects which would have been well worth figuring. The Rev. Conway Walter, however, has quite pardonably enlarged upon the subjects that he can speak about from experience. He is not by any means a young man; his memory is good, and his descriptive power the same as it always has been. It is astonishing what a lot of 'worthies' Horncastle has produced, of some of whom we had never previously heard. Lord Allerton is second on the list, and a quaint sketch of his career is given.

Throughout the work the author quotes full references. There are one or two points in this volume, however, to which it is as well to call attention in view of a second edition being issued. We doubt very much whether the author has given us sufficient (or any) evidence of the site being once a British Settlement (p. 1). The 'Mammoth' tooth, so well figured on page 5, is the tooth of a modern African elephant, doubtless a relic from an old bone-mill. The Hammer-head, which 'the writer has in his possession,' is by no means 'probably Roman.' The word 'has' is apparently a misprint for 'had,' as the identical specimen is figured in this journal for April 1908,* and is there described as British. Obviously, therefore, Mr. Walter has either over-looked the notes in 'The Naturalist,' or he does not agree with (and ignores) the opinion there expressed. In either case, 'tis a grievous fault! The small pipes found in Horncastle (p. 8), are not Roman, but are certainly XVII. century. To 'picture to ourselves the Roman sentinel . . . solacing himself with his pipe,' is allright; but we might just as well picture the Roman sentinel careering round the walls of Horncastle on a 40 h.p. landaulette. The volume is printed upon glazed paper, which makes it unnecessarily heavy. We are now sending our copy to the binders to be lettered on the back. Otherwise, when on the book-shelf, we should not know whether it was a History of Horncastle, a scrap-book, or a psalter.

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* 'Pre-historic Remains from Lincolnshire,' p. 137.

PAUCITY OF REDWINGS IN THE WEST RIDING.

HARRY B. BOOTH, M.B.O.U.

A YEAR ago* I reported on the unusual numbers of Redwings that had passed through this district, particularly overhead, and especially during the night of November 4th, 1907. This season it was the very opposite, and I never remember having heard or seen so few Redwings ; and my friends report similarly. The 'birds of passage,' which we usually expect to hear in numbers during the last week in October and in early November, were only heard in stray and desultory parties, notwithstanding that the weather at the time appeared to be most favourable for hearing them. Neither have we been more favoured with the Redwings which remain here during the greater part of the winter, nor the additional ones that arrive in this district on the approach of a severe frost ; they have been in much smaller quantities all round.

It is rather puzzling to learn that the same species passed in larger numbers than ever in several places in Scotland last autumn.† Mr. W. Eagle Clarke tells me that he has never previously seen so many on the Fair Isle (intermediate between the Orkney and Shetland groups). In the 'Annals of Scottish Natural History (1909, p. 7), Miss E. V. Baxter, in 'Bird Notes from the Isle of May' (Firth of Forth), writes of the Redwing :—'After I left, Mr. Maccuish (the light-keeper), reports a great "rush" on October 16th, and on the 23rd, from 2 a.m. till daylight (W. wind, light, hazy) "an enormous rush" followed, and another from 7 p.m. on the 23rd till daybreak on the 24th. On the 27th, 28th, and 29th of October, there were large flocks at the lantern ; from 6 p.m. on the 3rd of November till daylight on the 4th, there were many at the light ; and next night the "rush" was repeated. Mr. Maccuish says that this was the largest "rush" of one species that he has every seen.' There are also several other places in Scotland where Redwings have been noted as more numerous than usual.

I don't wish to infer that birds passing over parts of Scotland should pass over our immediate neighbourhood ; but it certainly appears strange that whilst Redwings should be passing south in Scotland in such great numbers, we should be wondering why they are so scarce this season, both as 'birds of passage' and as winter visitors. These birds (even if unobserved), must have passed somewhere in the north of England or Ireland, and to these must be added many that usually make use of this neighbourhood during the greater part of the colder season. I have not heard of any great numbers having been reported, not even on the coasts. I would like to suggest that each reader of 'The Naturalist,' who has taken notes of the movements of Redwings during the present season, should send in a short report to the Editors. These could be tabulated, and we might obtain some sidelight on the complicated question of bird migration, and more particularly respecting a bird whose movements are perhaps more easily traced in our island, than are those of any other species.

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* 'The Naturalist,' 1908, p. 17.

† A large number passed Spurn in the month of October.—EDS.

Fieldfares are also in smaller numbers here than usual, but the difference is not so marked as in the case of the Redwings.

◆

EUPHRASIAS OF NORTH-EAST YORKSHIRE.

J. G. BAKER, F.R.S.,

During my visit to North-East Yorkshire last summer, I collected several Euphrasias, which have been kindly examined for me by Messrs. Bruce, Jackson and Pugsley, and determined as follows :—

E. borealis Towns. Side of the road between Whitby and Scarborough, near Hayburn Wyke.

E. stricta Host. East Row woods, near Sandsend and an allied form, by the side of the Whitby and Scarborough road, near Hayburn Wyke.

Form between *curta* Fries and *gracilis* Fries. Side of the lower road between Castleton and Westerdale.

◆

Mr. F. H. Day records *Arœocerus fasciculatus* De Geer, as a British insect, in 'The Entomologist's Monthly Magazine' for December. The insect occurred in some numbers in a confectioner's shop window in Carlisle.

No. 69 of 'The Mineralogical Magazine' has recently appeared, and contains an obituary notice of Dr. H. C. Sorby, by Prof. J. W. Judd. Sorby's researches and methods undoubtedly made mineralogical science what it is to-day. Mr. A. B. Dick contributes some notes on Kaolinite, and records examples of this mineral from Anglesey, from the Hambleton Quarry, near Bolton Abbey ; in the sandstone of a coalmine near Newcastle-on-Tyne ; and 'in the millstone grit of a quarry at Congleton, Cheshire.'

THE HORNET IN YORKSHIRE.

Rev. W. C. HEY, M.A.

In reference to the note appearing at the foot of my paper in the February 'Naturalist,' I quite admit that the Hornet has been taken in Yorkshire. I was aware of this as I had Mr. Roebuck's 'List of Yorkshire Hymenoptera' before me. Still I should not term the Hornet a Yorkshire Insect. In the case of creatures such as Birds and Wasps, which have a rapid and easy method of locomotion, the occurrence of a few stragglers within the county borders does not, to my thinking, give them the right to be called Yorkshire species. If I crossed the channel, and spent a few hours on the sand-dunes at Calais, I should not become a Frenchman. 'In spite of all temptations to belong to other nations,' I should remain an Englishman. Of course, the occurrence of these 'vagrom' creatures should be recorded, for they may possibly be the pioneers in an extended distribution of the Vespæ. When such a species breeds within the county, or becomes a regular visitor, then I should call it a Yorkshire species.

The easiest method to distinguish the Hornet from the other species, is by the colouration. *They* are all coloured yellow, with black markings, but the Hornet wears brown and orange. If people knew and remembered this, no other insect could be mistaken for the Hornet.

I find the term Hornet is also sometimes applied to another large Hymenopteron, viz., *Sirex gigas*. This mistake is natural enough when a person simply conceives of a Hornet as an aggravated form of Wasp—'just like a Wasp only more so'—as has been said.

◆

Popular Natural History of the Lower Animals (Invertebrates), by **Henry Scherren, F.Z.S.** Second Impression. 288 pp., 2/6.

In this the author rightly points out that whilst most popular natural history books deal with the larger animals, few deal with the backboneless animals. 'Field and hedgerow, park and garden, pond and strand will yield the young naturalist hosts of subjects for investigation,' and in order that the volume may be of practical service, directions are given for keeping these under observation. Mr. Scherren then deals with arthopods, insects, crustaceans, starfish, worms, sponges, etc., etc., in a very entertaining way, and the book is rendered more interesting by nearly two hundred illustrations, some of which are coloured. The volume is very cheap, and should do good by creating an interest in the more neglected branches of natural history. It is quite refreshing to find a natural history book now-a-days in which birds are not described.

FOSSIL PLANTS FROM THE MARSKE AND UPLEATHAM QUARRIES, YORKSHIRE.

Rev. GEORGE J. LANE, F.G.S.,
AND
Mr. T. W. SAUNDERS.

A party of Yorkshire geologists, as intimated in a previous issue of the 'Naturalist,' visited the Marske quarries in September 1908. On that occasion many specimens of Lower Estuarine plants were obtained, and by this time, no doubt, their genera and species will have been determined. The two quarries are rich in plant remains, and the writers were urged by the geological party above mentioned, to make further investigations. This delightful task has been prosecuted with vigour.

To readers unacquainted with these quarries, a few elucidatory notes will be helpful. Mr. Fox-Strangways, in his memoir of Jurassic strata of Yorkshire, gives the following table of Bajocian strata :—

1. Upper Estuarine beds.
2. Grey or Scarborough Limestone.
3. Middle Estuarines.
4. Millepore beds.
5. Lower Estuarines.
6. Dogger.

Plants have been collected from each of these Estuarine beds. The Millepore bed is absent in North-East Yorkshire, making the line of demarcation between the Middle and Lower Estuarines difficult to determine. The Marske and Upleatham quarries are situated on the northern and southern faces of the Upleatham outlier of the Inferior Oolite. They are within easy access from Marske or Saltburn, and are equidistant from either station. The sandstones in the quarries are massive, lenticular, and current-bedding is conspicuous in both quarries. Superposed upon these sandstones are deposits of sandy shales, and above these there is a thin capping of glacial drift. Between the sandstones and shales there occurs a band of ironstone which, in some places, reveals a confused mass of fossil plants. This stratum of ironstone is continuous throughout the two quarries, in some parts attaining a thickness of eighteen inches, while in others, it thins out so as to be almost unrecognisable. This ironstone band is not fossiliferous throughout, large sections shewing not a vestige of a plant. The shales above the ironstone also contain plants, but these are sometimes very difficult to decipher, the venation being not so well preserved as in the ironstone.

Several years ago, the late Rev. J. Hawell did some excellent pioneer work in the Marske quarry, which resulted in the identification of seventeen species. He also found a *Dictyozamites* for the first time in England, which proved to be a new species, and was named *Dictyozamites hawelli.*

The following is a list of plants found by us since September 1908, duplicates having been given to the Hull and Middlesborough Museums. Many of these specimens have been submitted to Prof. Seward for diagnosis. We also wish to acknowledge the valuable assistance of Mr. Elgee of the Middlesbrough Museum, who has given us access to plants previously determined, and helped us in our determinations.

I. EQUISETALES.

Equisetites columnaris (Brongn.).
,, *beani* (Brongn.).

II. LYCOPODIALES.

Lycopodites sp.

III. FILICALES.

Teniopteris major L. & H.
,, *vittata* Brongn.
Sagenopteris phillipsi Brongn.
Cladophlebis denticulata Brongn.
,, *haiberensis ?*
Laccopteris polypodioides ?

IV. CYCADOPHYTA.

Base of flower of *Williamsonia* L.&H.
Fructification of ,, L.&H.
Williamsonia gigas L. & H.
,, *pecten* L. & H.
Otozamites beani L. & H.
,, *graphicus* Leck.
,, *parallelus* Phill.
,, *feistmantelli* Zig.
Nilsonia compta Phill.
,, *mediana* Leck.
,, *tenuinervis* Nath.
Dictyozamites hawelli Sew.

V. GINKGOALES.

Ginkgo digitata Brongn.
Baiera gracilis Bun.
,, *phillipsi* Nath.
,, *lindleyana* Schemp.
Czekanowskia murrayana L. & H.
Beania gracilis ? Can.

VI. CONIFERALES.

Araucarites sp.
Pagiophyllum williamsoni Brongn.
Brachyphyllum mammilare Brongn.
Cheirolepis setosus ? Phill.

We have other specimens in our possession pending determination. Further finds will be reported from time to time in 'The Naturalist.' We note that *Otozamites beani* occurs in Upleatham quarry, but is very scarce in Marske; *Teniopteris vittata* is found in larger specimens in Upleatham; *Nilsonia compta* is plentiful in the central part of Marske quarry; *Dictyozamites* is extremely rare. On much the same geological horizon near Carlton, Mr. Lane found recently two new species which Prof. Seward determined as follows:

Zamites sp., resembles *Z. buchianus* (Wealden Flora).
Zamites sp., probably new.

We feel convinced that further effort will be successful.

THE MIGRATORY MOVEMENTS OF CERTAIN SHORE-BIRDS AS OBSERVED ON THE DUBLIN COAST.

C. J. PATTEN, M.A., M.D., Sc.D.

(*Continued from page 52*).

SANDERLING (*Calidris arenaria*)

I have recently obtained some information which tends to modify one's views concerning certain migratory movements of this species. Until the year 1906, I believed that it was absent from the Dublin coast from about four to six weeks, which, speaking generally, extended from the end of June to the beginning of August. In the 'Aquatic Birds,' I mention that the migratory move begins in August, or even towards the latter end of July, but though I was under the impression that the supposed adult birds, seen early in August, could hardly as yet be returning from their breeding-quarters in the far north, I had an idea, shared by the late Mr. E. Williams, that such birds only partially migrated, and had flown down from Scotland, or perhaps from the Orkneys or Shetlands, having reached this latitude, but going no further north when on the vernal migration. However, the recent observations made by Mr. A. Williams go to show that this bird, like the Turnstone, frequents the Dublin coast throughout the year. In accordance with my own observations, Mr. Williams has noticed the Sanderling remaining until well on in June, when on its vernal migration, and returning at the end of July during the Autumn move. He informs me that prior to 1906, he made no records in early or mid-July. However, in that year, much to his surprise and delight, he discovered this species on the Dublin coast on different occasions in July, and not only a few stragglers, but flocks consisting of fifty birds, all, apparently, in nuptial plumage.

To Mr. Williams, then, is due the credit of discovering this bird frequenting the Dublin coast, at a period of the year when it was supposed to be away north, and I hope this investigation will receive the publicity of ornithologists. I am much indebted to him for his interesting information, and in a recent letter, he further informs me that he has seen the birds on several occasions during July 1907 and July 1908. But interesting though this discovery may be, it hardly seems to point to the fact that the birds might remain to breed within the confines of the British Isles. Indeed, there is every reason to think that the Sanderlings here recorded were non-breeding birds, for they were seen in flocks rather than pairs. As yet I have not had the opportunity of examining the genitals of the specimens which Mr. Williams obtained in July, but may remark that in several which I collected on the 16th August 1899, and again on the 7th August, 1900, all in apparent nuptial plumage, both ovaries and testes were minute and undeveloped. Here, then, the more positive evidence in the form of ripe ova which I found present in a Turnstone, shot in July, is wanting.

Turning again for a moment to the latter species, I would point out that in as much as it occurs in two distinct phases of plumage during the height of the breeding season, indeed throughout the summer, the question of the possibility of its breeding in Ireland should not be lost sight of. The phases of plumage assumed are :—(*a*) a plumage apparently similar to the dress worn during the first winter ; such, I believe is assumed by birds one year old ; (*b*), a highly variegated plumage, apparently similiar to the nuptial plumage, which one would expect would not be assumed until the birds were two years old.* *A priori*, one would expect the latter birds to breed somewhere or other ; if not in our latitudes, why have they passed northwards ? To return to the Sanderling, here the case is different. We have not external evidence to show that the so-called ' nuptial-plumed ' birds, seen in summer are really other than immature, that is to say birds one year old. For after the first autumn moult the *bird of the year** follows closely the plumage of the adult. Indeed, it is almost impossible to distinguish the two forms of plumage when the birds are on the strand, as only the wing coverts and tertials of the former show signs of immaturity. During the ensuing spring, the freckled and variegated markings of chestnut, brown, and black come out on the head, neck, and upper parts, and the birds to all intents and purposes have assumed the nuptial plumage. In the absence of a thorough histological examination of the reproductive organs which I hope to have the opportunity of carrying out, I venture to say that it is more than likely that the Sanderling, while assuming what is practically similar to the nuptial plumage when only one year old, at that age it does not breed. In this way its migratory movements are brought into line with those of other LIMICOLINE birds, which, in a great body, push northward in spring. The really mature birds pass us *en route* for more northern climes ; those that are immature, whether they have assumed a nuptial-like dress or not, tarry behind, and may be seen collected into small wisps or flocks on various parts of our coasts throughout the entire summer.

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* But I would say guardedly that, in the absence of positive information, it is conceivable that the so-called ' nuptial-plumed ' birds are in reality immature, and only one year old. That is to say some immature Turnstones may assume a nuptial-like plumage, others not, in their first year, just as the ' hood ' of the Black-headed Gull appears in some, and not in others of this species in the first Spring.

* Bred in northern latitudes, and not arriving in Autumn till early September.

For example we find, on the one hand, hundreds of Dunlins in apparent nuptial plumage, with their conspicuous black breasts ; on the other hand, numbers of Bar-tailed Godwits, in plumage apparently similar to that worn during the winter, remaining throughout the summer along our coasts. Such I believe are instances of species which do not breed when one year old, and this appears to me to be the general rule.

In conclusion I may add a few words regarding what we somewhat loosely term the ' tameness ' of shore-birds on certain occasions when on migration. With few exceptions, notably the Phalaropes, and in a much less degree the Dunlin, and perhaps the Ringed Plover, shore-birds, as a race are wary, and do not allow of near approach. It is true that the immature birds are, on the whole, not so shy as the adults, but some, for instance, the Redshank, Greenshank, and Curlew are always wary, except on their breeding-grounds.

Whether immature or adult, shore-birds on migration usually arrive on our slob-lands very tired-out, and that this fatigue is due almost entirely to the prolonged exertions of the wing-muscles during vast flights over sea, is evident from the way in which these birds will try every method of escape before taking wing. Sometimes they will race along the strand for a hundred yards or more when pursued, and will even take to the water and swim a short distance, especially if a sand-bank be close by. At other times they will remain crouched until almost walked over, and on a breezy day will suffer themselves to be carried with the wind, the wings being hardly brought into requisition. Any one who has made a special point of watching shore-birds just after their arrival, cannot fail to be struck with their tired, apathetic appearance, their silence, and the dislike they evince to taking wing.

1909 March 1

Nothing could be more conspicuous than this to the trained eye, accustomed as it is to the remarkable activity on foot and on wing of LIMICOLINE shore-birds.

Well do I remember the extraordinary 'tameness' of a Bar-tailed Godwit, the first that I had met. When a lad of nineteen, I was walking along the damp grass-grown edge of the slob-lands of the North Bull, early in the month of September, when, suddenly, a rather big-looking bird, with long legs and beak, popped up from a drain, and ran in front of me. From its demeanour it looked more like a domestic fowl running from the farmer, than a wild shore-bird. Suspecting it to be wounded, I gave chase, and only to avoid actual capture did it take wing, again alighting a few yards further off.

Being at that time anxious to collect as many species as possible from Dublin Bay, and unacquainted with the fact that the bird was plentiful in autumn and winter and obtainable at another time without difficulty, I entreated a passing gunner to procure it for me.

Looking back, this act seems unsportsmanlike; however, I preserved my specimen, which, as far as plumage is concerned, could not have been more perfect, displaying an unusually rich buff shading on the under parts.

On skinning the bird, I found how emaciated it had become from its journey, further evidence that its 'tameness' was due to fatigue. Since then I have frequently come across 'tameness' in many species, notably in the Curlew-Sandpiper, the Knot, the Wimbrel, the Golden and the Grey Plover, in every instance due to the circumstance above described.

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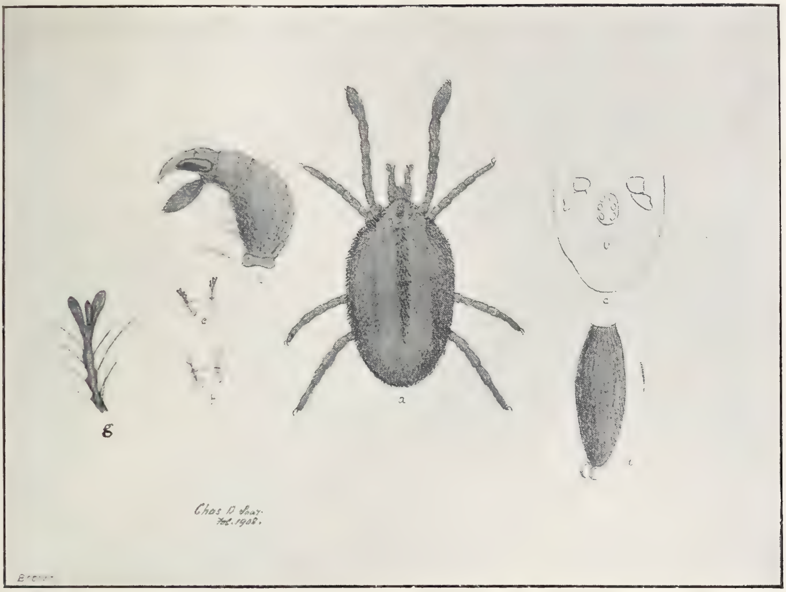
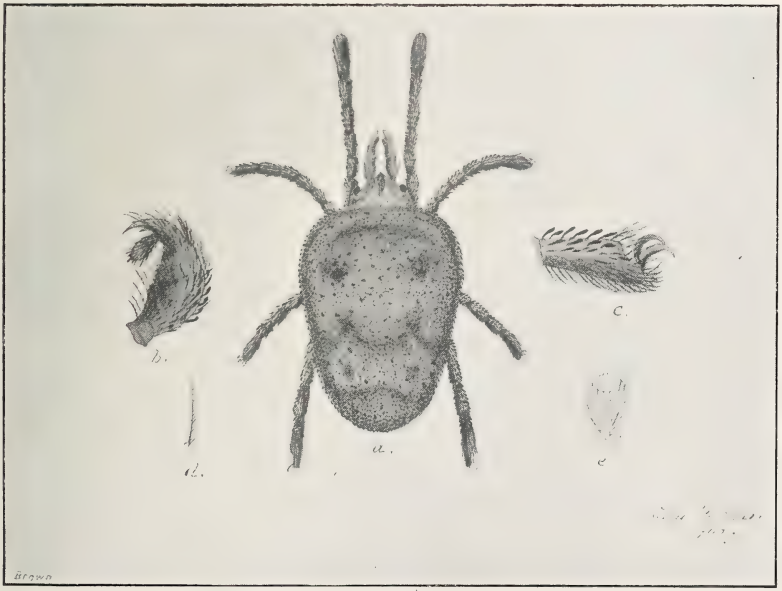
My Life: A Record of Events and Opinions, by **Alfred Russel Wallace.** New edition. London: Chapman & Hall. 408 pp., price 6/-.

Not since 'Huxley's Life and Letters' appeared have we been so interested in reading the life-story of a naturalist, as we have been in the present volume. It has the further advantage of being an autobiography, and consequently we get first-hand, Dr. Russel Wallace's own narrative of his glorious career. In the present edition, some of the items not directly relating to the author have been omitted, and consequently it is a much more handy form than the first edition. In many respects Hulxey's life was similar to that of Wallace. Both have had their hardships and trials; and Dr. Wallace's account of his early days, and of his financial speculations, are full of useful lessons. To the naturalist, however, his descriptions of his four years in the Amazon Valley, his visit to the Malay Archipelego, etc. will perhaps appeal the most; though to some, his racy descriptions of Lyell, Darwin, Huxley, Spencer and others will be of extreme interest. But there is not a page in the volume which has not some useful or interesting piece of information. It is plentifully illustrated by photographs, sketches, etc., and is well produced.



a. ***Ottonia ramosa.***
b. Palpus.
c. Part of ventral surface.

d. Last segment of first leg.
e., *f.* Hairs of body.
g. One highly magnified.



a. ***Ottonia bullata.***
b. Palpus.
c. Last joint of hind leg.

d. Hair of leg.
e. Hair or papilla of back, highly magnified.

BRITISH
NATURAL HIST

SOME BRITISH EARTHMITES.

Trombidiidæ.[*]

(PLATE IV.)

C. F. GEORGE,
Kirton-in-Lindsey.

In 1877, Professor Kramer initiated a genus, or sub-genus of Trombidium, which he named *Ottonia*, the distinction being based on the fact that the eyes had not the long petiole as in Trombidium, but were rather embedded in the skin of the cephalothorax. I take it that the mite I am about to describe belongs to the sub-genus, I call it therefore *Ottonia ramosa*. So far as I know, it has not previously been figured or recorded. It is a rather small mite for a Trombidium. Mr. Soar gives the length of the body as 1.28 mm., and the breadth .38 mm. It is of a rose madder colour with a dash of pink, very beautiful; in shape, it is something like *fuliginosum*, but not quite so elongate, the distal end of the fourth joint of the palpus is furnished with two distinct claws, (see Plate IV., figure B). In *holosericeum* and *fuliginosum*, it is single (see in 'The Naturalist' for 1908, figures on page 333 and Plate XLII.).

This peculiarity seems to be the rule in the smaller species of Trombidium. The eyes are each provided with two ocelli and are embedded in the skin of the cephalothorax, the distal joint of the fore legs is larger than the others, club-shaped, and flattened sideways (see figure D). The other legs are formed on the same plan as the mites already described; they have not the peculiar footpad found in *fuliginosum*. The female genital aperture has the usual copulatory discs, three on each side (figure C). The papillæ on the body are most remarkable; they are all rather coarsely barbed, but many on the back, and especially those at the sides and posterior part of the body, in addition to the barbs, have the ends divided into two, three, or more branches (hence the name *ramosa*). These branches are almost as thick as the main stem, and look more or less like tassels (see figure E., F. and G). The papillæ are not placed so close together as in some mites, and seem to be arranged in irregular longitudinal rows. When the mite is mounted in Canada balsam, without too long preparation, the colour is retained to a considerable extent in the papillæ, which then look very handsome. Hermann, in 1804, pointed out the value of the papillæ as characteristic marks of species, and gave figures of several of them in his great work. Mr. Soar, in May 1894, and Mr. Wm. Evans, of Edinburgh, kindly sent me a most beautiful specimen of it last year. Evidently it is widely distributed.

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[*] For previous papers see the 1907 volume of 'The Naturalist.'

Ottonia bullata.—This pretty little mite was sent to me alive, by Mr. W. Evans, of Edinburgh, It was of a fine scarlet lake colour, and under a low power of the microscope it looked very rugged. This appearance is produced by the structure and arrangement of the hairs or papillæ, which are very remarkable, and characteristic. When highly magnified they seem to be little hollow globes, with a circular opening at the top, and a stalk at the bottom, which fits into a socket like a candle in its stick ; the flange of the candlestick being cut into several teeth or leaflets, something like the calyx of a flower (see figure E). The globular part is covered with minute hairs, which project beyond the circular opening ; and are generally arranged in rows from above downwards, forming lines similar to the meridian lines on a globe. The papillæ vary in size, and are not arranged in lines, but in irregular rosettes or circles. The mite also has other remarkable hairs, such as those on the under side of the palpi (figure B.), which are finely pectinated ; and again others flattened rather feather-like towards their distal ends, as in figure C., on the upper side of the legs and palpi. The eyes are very prominent, and situated on each side of the cephalothorax. The palpi have two claws at the distal ends of the fourth joint. The legs are as usual, rather short, the fore ones being slightly the longest, and have the last joint clubbed, and slightly longer than the others. They are without the peculiar foot-pad between the claws possessed by *T. fuliginosum.* The sternite is also peculiar, but is not shewn in the figure. When mounted in Canada balsam, a good deal of colour is retained, and the papillæ seem to alter slightly, becoming less globular, and more cup-shaped, like Mr. Soar's drawing (figure E.).

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We have received from Mr. R. W. Goulding, of Louth, a copy of a most interesting paper, read to the Louth Antiquarian and Naturalists' Society. It is entitled 'The Building of Louth Spire, 1501-1515,' and is based upon information obtained from the earliest volume of the Louth Churchwardens' accounts. The Spire is built of Ancaster Oolite, quarried at Willeffurth (= Wilsford), Keylby (= Kelby), and Hessilbrugh. The total cost of the work appears to have been £305 7s. 5d.

TWO ANCIENT BURIAL CAIRNS ON BRIMHAM MOOR, YORKSHIRE.

A. LESLIE ARMSTRONG, P.A.S.I.

By permission of the Right Hon. Lord Grantley, I was enabled to make a careful examination of two of the ancient burial mounds of ' Graffa Plain,' Brimham Moor, on Tuesday, August 4th, 1908.

Mound No. 1, of circular form, and about 12′ 0″ in diameter, is situated about 150 yards north-west of the first large group of rocks, upon the south-eastern boundary of the moor, and about 50 yards south-east of the trackway leading to ' Riva Hill Farm,' and it occupies the summit of a slight hillock, upon a comparatively level portion of the heath, which rises rapidly to the south of it in a bold sweep, terminating in the outstanding rocks of Graffa Crags and Brimham Beacon.

The entire absence of any heather upon the mound, and the profusion of bright green bilberry plants which covered it and at the same time rendered its outline more noticeable, told plainly of a different character of subsoil from that of the surrounding moor ; but prominent as the mound appeared, its actual elevation was deceptive, being barely two feet above the natural level, and the uneven character of the upper surface suggested previous disturbance to be more than probable. A few attempts to pierce the crown, however, proved it to be a cairn, constructed of large stones, and accounted for the prolific growth of the rock-loving bilberry which overspread it, as well as for the uneven character of the surface.

The thick green covering was carefully stripped off in lengths and placed on one side, and the few inches of vegetable earth removed, revealing the cairn in an almost perfect state, formed of a series of large stones placed methodically in concentric rings, each stone slightly inclined towards the centre, and the whole mass interlocked together by their own weight. Large stones were placed around the outside forming the enclosing circle, which is almost invariably found in the case of earth-built tumuli, and a few of these had been visible before the covering was stripped.

The construction of the cairn rendered it necessary to remove the stones from the outer ring first, and to work gradually towards the centre where the burial, if such existed, might be expected to lie. This proved no easy task, as the stones were so tightly wedged, and had each apparently been specially selected for the purpose. Almost without exception, they were about a foot in diameter, oblong or oval in form, and three to five inches in thickness, with flat surfaces and rounded edges. No marks of tools were visible on any, but all alike were either water-worn, or had been especially rubbed to their present form. The stone itself was the Millstone Grit of the surrounding moor, but fragments of stone of the form composing the cairn are not now to be found thereon readily, although a careful search might reveal such. Personally I am inclined to think that they have been transported from a considerable distance; that great care has been exercised in their selection is indisputable.

When nearing the inner radius of the cairn, small fragments of charcoal were noticeable, but they were by no means in large quantities. There was also a layer of fine grey sand an inch or two in depth, which had apparently been spread over the natural surface of the ground, and the stones bedded therein. Sand of this kind is abundant in the vicinity of the rocks upon the moor.

In the centre, large pieces of stone were piled around a rough circle of about 3′ 6″ extreme diameter, and within these, large and small stones, all of the form previously noticed, were laid more or less upon their flat surfaces, and amongst them the grey sand and charcoal were very evident; pieces of the latter up to an inch square, being found.

Upon the gradual removal of this central mass of stones, the presence of the unmistakable black 'barrow earth' became evident in a slight layer, perhaps an inch or an inch and a half in thickness, and spread over the whole area within the inner ring, the bottom of which had been paved with large flat stones. Amongst this earth very slight traces of a greyish white paste-like substance were visible, probably the decomposed remains of the bones after calcination. The deposit was carefully gathered together. Its removal bared the large stones forming the bottom of the grave, and these proved to be two in number, the largest being about 2′ 0″ across, and of a somewhat angular form; strikingly different to those composing the cairn itself, for the edges were rough fractures, not rounded in any way. Apparently the surface soil had been removed from the ground upon which the cairn was built, for the upper face of the two stones forming the bottom was level with the natural ground surface adjoining, so far as could be ascertained, and these had apparently been laid down for the reception of the deposited remains.

As there was every reason to believe that some portion of the ashes might have been placed in an urn, efforts were made to raise the stones above mentioned in hopes of a discovery. This was by no means easy, but by care and perseverence, it was at last accomplished, but only to meet with disappointment. Immediately beneath was a slight layer of ashes upon the natural ground surface, which latter showed very evident signs of fire, the bright yellow sand composing the substratum being calcined to a dark red colour for quite 2″ in depth. This sand was very stiff and compact. The most diligent search failed to reveal any trace of a hole or other disturbance at any point, or of any implements which might have accompanied the body, either upon the surface or amidst the cairn.

One stone found amidst those immediately covering the deposit, was remarkable because entirely different from all the remainder composing the cairn, and appeared to have been shaped with some definite object in view. It was a fragment of hard sandstone, in the form of a truncated pyramid, the sides and top being roughly fractured to shape, but the base was quite smooth, and bore marks of friction. The base measured 6″×5″, and the height about 4½″. This might have been used as a crushing and grinding stone for grain, or for rubbing purposes, but careful search failed to reveal its companion slab. With this exception, nothing was found that could be considered as having been fashioned for use, and there was nothing to throw any light upon the probable period of the cairn's erection.

The second tumulus examined is situated about 100 yards south-west of the first. It was of rather irregular shape, and appeared to have been somewhat disturbed, but the original diameter had probably been about 9′ 0″. Upon examination, it also proved to be of the cairn type, and apparently similar to that previously opened, but it had been disturbed throughout at some distant period, and no trace of the deposit could be found, although the yellow sand forming the subtratum was noticeable, calcined over the whole area as before. There were also traces of charcoal. It is remarkable that amidst the smaller stones of this cairn another ' rubbing stone ' was found, almost identical with that in the former one, and similarly, this proved to be the only 'find' of any description bearing certain traces of man's handiwork.

Although somewhat disappointing not to be able to assign the erection of these cairns to any definite period, yet their examination proves valuable for two reasons. First it places beyond any question the nature of the mounds scattered over this portion of Brimham Moor, which is known by the name of 'Graffa Plain,' a name which the late Mr. William Grange translates as 'the place of graves'—significant in itself, though he at the same time casts a doubt upon the formation of the mounds in question being anything other than natural. The identity of the grave mounds being established, they prove that a settlement of primitive man of no small magnitude must have been located somewhere in the vicinity.

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'Saint' Gilbert: The Story of Gilbert White and Selborne, by **J. C. Wright.** London: Elliot Stock. 90 pp., 2/6.

In this little book the author adds one more to the many dealing with that prince of naturalists, Gilbert White. We cannot say that the volume contains much that is new, but it is obviously written by one who appreciates White's worth to the full. He describes Selborne and its objects of interest, and then gives some account of White himself, and of his methods. There are eight illustrations. We don't like the word 'Saint.'

British Birds and their Eggs, by **J. Maclair Boraston.** London: W. & R. Chambers, 1909. 301 pp., price 6/- net.

Whilst the author of this book has certainly not chosen anything new in the way of either subject or title, he claims to bring forward 'a new method of classification.' He points out that other books are arranged according to genera or species, or merely in alphabetical order; but how can a beginner 'be expected to turn to identify a bird in a book wherein birds are grouped according to generic distinction, about which, as yet, he knows nothing?' The birds are consequently grouped under such headings as 'Black-and-White Birds,' 'Ruddy-breasted Birds,' 'Trunk-climbing Birds.' Whether this method of classification is the best, or whether it is entirely new, we are not prepared to say; but we imagine we know of one writer who will claim that he has adopted this method for some time! Under 'black birds' there are Rook, Raven, Carrion Crow, Chough, Jackdaw, etc.; but we find that the Scoter must be looked for under 'Diving Ducks,' and the 'Swift' is under 'Swallow and Swallow-like birds.' In some of the other divisions, cross references are more complicated. Each species appears to be described in a way suitable for a beginner; and, following the account of the bird itself, there are notes under 'Eggs,' 'Nest,' 'Distribution,' etc. There are no fewer than 136 coloured plates, which will do for a beginner, and probably answer his purpose. These must have been very expensive to prepare, and conseuently it seems a pity they are so poor. Most of the birds are surrounded with a halo, and they are usually perched in mid-air, in a cotton-woolly atmosphere. Whilst many are passable, some are really vile—the Bullfinch and Wheatear being coloured like the patches on Joseph's coat. We don't quite know what to say of the House Martin and its nest (plate 58). There are sixteen coloured plates at the end, upon which illustrations are given of the eggs of *all* British breeding birds. In each case, we are informed, they have been drawn and coloured from the shell. The volume is a substantial one, and cheap at 6/-.

SOME LINCOLNSHIRE BOULDERS.

F. M. BURTON, F.G.S., F.L.S.

My attention has recently been called by the Rev. C. E. Laing, the Vicar of Bardney, to some boulders on the side of a drain, about three miles from that village. On going there to see them, I found two of considerable size—No. 1, 5 ft. 2 in. by 4ft. 4in., and about 2ft. 6 in. deep; and No. 2, 5 ft. 8in. by 3 ft. 2 in., and about 2 ft. 6 in. deep. Both boulders were fast embedded in the ground, and the depth measurements were taken by probing with an iron rod at their sides.

The soil in the locality consists of Kimeridge Clay, with a thick covering of chalky Boulder Clay on the top.

The drain, on the north side of which the boulders lie, is in the parish of Bucknall, not far from Bucknall Bridge. It was excavated about sixty-three years ago, as old inhabitants who helped in its construction affirm, to connect an old drain—coming from Minting and Gautby—on the west with the Stixwould drain on the east, and thence into the Witham river. Before this time, this old drain joined the river at Southrey, and traces of its former course are still visible.

No 1 boulder, which is not unlike a block of Lias limestone in appearance, is highly fossiliferous; the fossils lying in heaps, broken up and cemented together, with few entire ones, chiefly Cerithiums, amongst them.

No. 2 is a hard sandstone, and has scarcely a trace of a fossil in it.

On a second visit to the spot, I met with several more boulders, (Nos. 3, 4 and 5), embedded, like the first two, on the north side of the drain. No. 3 measures 2 ft. 5 in. by 2 ft., but the ground, for want of rain, was so hard, that the depth of the boulder could not, with any certainty, be ascertained. No. 4 measured 3 ft. by 1 ft. 11 in., and about 2 ft. deep; and No. 5, 3 ft. by 2 ft., and about 2 ft. in depth. All three were of similar substance to the sandstone boulder No. 2. From the uniform depth of all these boulders, it may be inferred that the matrix they have come from will turn out to be a narrow band of rock about 3 ft. in thickness.

On referring to Mr. Wheeler's 'History of the Fens of South Lincolnshire,' I find that the area north of the Witham in this district, including Bardney, Southrey, Tupholme, Bucknall and Stixwould, was drained under the Act of 1843, which confirms the testimony of the old inhabitants as to the time when this Bucknall connecting drain was made. Mr. Wheeler, writing to me on the subject, says, ' the boulders you mention are no doubt kinsmen of those found when the New Cut for the Witham was made.' This is referred to in his book as follows :—' In the excavation for deepening the Upper Witham, some boulders of Lias limestone and sandstone were found, the largest of which was about 6 ft. by 4 ft., and 2 ft. 6 in. deep.'

No 1 boulder, from its appearance, seemed to me to differ from the remaining four, but, from the interesting account of them given by Prof. P. F, Kendall, they are all, doubtless, from nearly the same source ; and, in all probability, those Mr. Wheeler mentions had the same origin also.

The fossils contained in the boulders, with a few loose ones lying about on the ground all in fragments, have been identified by palæontologists in the Jermyn Street Museum, and, through the kind aid of Mr. G. Barrow, I have received the following particulars :—

No. 1 boulder—Fragments of Ammonites, Gasteropods and Lamellibranchs. *Pecten lens* Sow ? *Ostrea* sp. *Cerithium* sp.

The four remaining boulders are of sandstone, with fragments of Lamellibranchs. Loose fossils—*Am.* (*Perisphinctes*) *varicostatus* Buckl. Nodule shewing septarian structure and *Am.* (*Cardioceras*) *cordatus*, with *Serpula* sp. attached.

This last, Mr. Barrow allocates to a bed he knows well, *a limey clay band with Vermiculites*,' a type of thing from the base of the Ampthill Clay, just over the top of the Oxford Clay (thus proving its near local origin). The large ammonite and the clay band nodule (he adds) probably came from the same area.'

As to the matrix from which the boulders were derived, Prof. Kendall has identified them as all coming from the same source, the Spilsby Sandstone. ' Your boulders,' he writes, ' are more interesting than you think. There is no such variety (referring to No. 1) known *in situ* in Lincolnshire, but I have found very large boulders, greatly resembling yours, though far more fossiliferous, and having the fossils most beautifully preserved. They occur in a train extending from near Donington-on-Bain away southward and westward into Cambridgeshire, Norfolk and Northamptonshire, though not in the fossiliferous aspect ; there is, however, another test by which I can recognise them, namely, by the presence of lustre-mottling.'

Referring to a large boulder he met with, like No. 1, he writes further : ' My boulder was found near South Willingham Station, and I recorded it in " Proc. Geologists' Association," Vol. XIX., Part 3, p. 126. It agrees precisely with yours in general aspect, mineral condition and fossils, as you will see from the specimen I send you for comparison. It is a calcareous sandstone, with local developments of calcite, enclosing the sandy grains in such a manner, that, when broken across, lustrous fractures showing the cleavage of calcite, but crowded with sand-grains, may be seen ; this is what is termed " lustre-mottling." The patches seem to be in the form of rather acute rhombs, as though the calcite were in the form of dog-tooth spar—this character of lustre-mottling appears in the typical Spilsby Sandstone of Spilsby.

' As to the fossils (No. 1 boulder), taken as a whole, they have a remarkably Kimeridgian look, reminding me of the beautiful Kim. fossils, obtained from the pits at Market Rasen, but there are significant differences. Ammonites of the *biplex* group are very abundant ; your specimens show crushed examples, but my own include exquisitely-preserved specimens. I have, too, the cast of a very large ammonite, with smooth outer whorls. *Pectens* resembling *P. lens,* are not uncommon ; there are also forms like *Modiola,* and beautiful *Astartes,* very like the species common at Market Rasen. *Cerithium* is the only common gasteropod.

' The Sandstone you sent ' (alluding to chippings from boulders Nos. 2, 3, 4 and 5), ' is clearly another aspect of the same rock, and it is not unlike some of the Spilsby Sandstone of the country about Six Hills.'

The five boulders here described have not, from what I can learn, been previously recorded, nor is this, for various reasons, to be wondered at. When they were first laid bare in the ' forties ' of last century, the results of ice-action were comparatively unknown and uncared for, and everything since then has been against their discovery. Though of considerable size and not far from a public road, they cannot be seen from it, nor from Bucknall bridge, which passes over the drain. The locality is little frequented except by field-labourers and villagers. The bank on which the boulders lie is now, and has been for years past, overgrown with briars and thorns, long grass and other coarse herbage; and had it not been for the giving-way of the soil, thrown up on the south of the drain when it was first made, the repairs to which attracted Mr. Laing's attention, they might have remained undiscovered for an indefinite period. So quiet indeed is the spot, that Mr. Laing and some members of his family had the pleasure of watching a litter of foxes playing under the roots of one of the old thorn trees on the side of the bank, near where the boulders lie—proof sufficient of the solitude of the place.

My best thanks are due to Mr. Barrow and Prof. Kendall for their valuable aid in unravelling the nature and origin of the boulders; to Mr. Wheeler and others for the information they have supplied; and to the Rev. C. E. Laing, for bringing the boulders to light. If Incumbents in the country would note any disturbances of the land-surface in their respective parishes, and call attention to them, as Mr. Laing has done in this case, much of interest that would otherwise be lost might sometimes be the result.

The Romance of Modern Geology, by **E. C. Grew.** London: Seeley & Co., 1909. 308 pp., 5/-

In this well-written volume the editor of 'Knowledge' gives an entertaining account of the study of the earth from the earliest times to the advent of man. By comparing our sphere with a golf ball, he makes simple what is usually difficult to explain in a popular way, regarding the early history of our planet. A strong feature of the book is the description of the various extinct animals. This is done in a very careful and pleasant manner, and is illustrated by reproductions of the remarkable drawings which appeared in Knipe's 'Nebula to Man.' The book is prepared for young readers, for whom it will prove exceedingly attractive; and there is much in it that will appeal to older people.

Nature near London, by **Richard Jefferies.** London: Chatto & Windus. 212 pp., 5/- net.

In wading through the wealth of 'nature study' literature that is now at our command, one frequently feels like tramping through a desert, and gets weary of the monotonous stuff which the would-be Gilbert Whites have thought fit to have printed. But now and then, like a gem in the sand, a real treasure is our reward; we find a writer with a soul, whose pen can express his thoughts. Such a writer was Richard Jefferies. To read his books is to know what Nature really is, and to learn what one of her devoted sons has seen and heard. In 'Nature near London' we have one of these refreshing volumes; in it are described what only Jefferies could describe so well; and to read it leaves one wondering that even he could find so much that is beautiful near that most un-Nature-like place. Would that for our great crowd of book compilers we could exchange but a few like Richard Jefferies, and our literature would be the richer, we should be the wiser. In the present work we have a companion to 'The Open Air,' recently reviewed in these columns. It is as tastefully produced, and is illustrated with a dozen coloured plates by Ruth Dollman, who has well interpreted the scenes described by the author—the plates 'When the June Roses open on the Briars,' and 'A great Hawthorn Bush grows on the Bank' being superb.

THE OXFORD BRITISH PLANT LIST.

G. CLARIDGE DRUCE, M.A., F.L.S.,*
Oxford.

In the very masterly review of the above work, from the pen of my old friend Dr. Arnold Lees, in which he has been so very appreciative a critic (a marked contrast from that adopted in certain other quarters, where the vantage ground of knowledge of field botany was not so evident a standpoint), the writer singles out points on which I may be able to add some information.

First, *Rhinanthus grœnlandicus* Chabert; this was only made known to me after my list had been printed off. It is in the new 'Addenda' with many others. Doubtless the micro-species of this genus and *Euphrasia*, etc., are out of proportion when compared with the species of *Melampyrum*. In fact, I think with Dr. Lees, that too great prominence is given to them. The difficulty is in grouping them. I at first, thought of choosing another type for the subordinate species, and in a second edition, I may do so, but eternal vigilance is required in avoiding mistakes when several types are used. The 'micro-species' of *Rhinanthus* appear fairly constant: *borealis* is a high northern plant, with broader leaves than the other small alpine *Drummond-Hayi*. My name simply appears connected with them from the fact that Dr. Sterneck described them as species of the genus *Alectorolophus*, while I use the generic name *Rhinanthus*, although *borealis* and *monticola* were first found by me. It is quite possible that the latter will be found on the Yorkshire moors, and the former possibly on the higher hills. It is distinctly alpine.

Dr. Ostenfeld has recently suggested that *Euphrasia foulaensis* and *scotica* are really forms of the widely-spread continental *E. minima*, of which indeed, a form has recently been found in Somersetshire. The mountain forms of *Rhinanthus* already alluded to, are absolutely native, and occupy areas untouched by man. The name *R. Perrieri* Chab. as given in one of the other lists, cannot stand. Chabert established it on a character which is common to many of the forms not necessarily restricted to *rusticulus*. For that reason, Dr. Sterneck adopted the latter, and as the species name, which also is due to Chabert.

Orobanche arenaria is omitted from my 'list' because there is no satisfactory evidence of its ever having been found, as

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* 1909 March 1.

Mr. Lester-Garland long ago pointed out in 'Rep. of Exch. Club,' the character [which Babington] relied on to separate it from *O. purpurea* was valueless. I think Babington's plant may be the *Spitzelii* of my list, but as yet, I have not been able to see Babington's type. The '*arenaria*' of a good British botanist from Guernsey is *O. amethystea.* In this genus we have plenty which appear to be in a state of flux, and really definite characters are difficult to find, which are constant. In some instances, it may be the host has a modifying influence on its unwelcome guest, or it may, as in the Hieracia, Kœleria, Taraxacum, etc., species are in 'the making,' and not yet firmly fixed. My var. *alpicola* Reichb was so large a flowered form of *Pinguicula vulgaris* that Boswell Syme at first was inclined to refer it to *grandiflora.* It occurred in Western Ross.

Poa cenisia All. b. *flexuosa* (Wahl.) given in 'Lond. Cat.', should be deleted. Hackel at first referred the plant I gathered on Ben Lawer to *cenisia,* but on my obtaining more examples he, and I have no doubt correctly, said No. I published the correction in the 'Ann. Scot. Nat. Hist.' It is true Mr. Fisher said he thought the specimens were a new form of *P. arctica,* and he promised to go into the matter, but beyond losing my type specimen, I have heard nothing more from him about it, and his opinion cannot override that of the great systematist. There is little doubt that the plants were an extreme alpine form of *Poa pratensis,* with large flowers. Hackel himself named my specimen of *Festuca dumetorum* L., closely allied, as Dr. Lees says, to *F. rubra* L.

The fern *Botrychium lanceolatum,* rests on very slender evidence. It was supposed to have been found on the sands of Barrie, in 1839, by a Mr. Cruickshank, who sent a *drawing* of it to Newman (see 'Brit. Ferns,' Ed. III., p. 32), who referred it to *B. rutaceum.* No one has refound it, nor do the specimens of Cruickshank appear to be in existence (' E. B.', XII., p. 29). Perhaps I ought to have put it in my list in brackets, but the same might be said of *Ranunculus gramineus, R. alpestris, Carex brizoides,* etc., but space had to be considered.

I hope, at no distant date, to deal with the reported plants of Britain, which have not been verified, so that a list of them with the evidence on which they have been reported, may be available for consultation. I should much like to see the Yorkshire *Inula britannica* L. I have the species from Groby Pool, Leicester, and have gathered it in Austria, etc. It is not like *Helenium* at all, and essentially differs in the achenes being *hairy*, not *glabrous*. The lower leaves are from ½ to ¾ of an inch, broad, not 6 to 8 inches, as in *Helenium*. Loudon, excellent as he is, has not space to give an adequate description of the plants, and he omitted the *special*, and indeed also the *group* characters, the latter being *Folia involucri, apice dilatata*, = *spathulata*, in *Helenium*, whereas in *I. britannica*, which is in the section Enula Duby—'*Folia, involucri interiori apice acuminata*.'

The ' permanence ' of the trivial name, which is a botanical rule, led me to choose the badly descriptive name *paniculatum* for the broad-leaved Cotton Grass. It was called *Linagrostis paniculata* before it was named *Eriophorum latifolium* Hoppe. But a good many battles will have to be fought before we get even our British plant names correctly.

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ADDITIONAL NOTE.

F. ARNOLD LEES, M.R.C.S.,

By way of rider to the foregoing, I would add certain facts, privately communicated by G. C. Druce, which should prove stimulating to those North of England Field Botanists, who are inclined not to hide their light under a bushel. We have at least three ' new,' undescribed British Plants, and two of them Yorkshire species ! to which attention should be called, and herbaria examined for with as little delay as possible, so the results may appear in my Supplement. These are :—

1. *Montia lamprosperma* Chamisso, the *shining chestnut-brown faintly reticulate* seeds of which have been detected in Leaf-bed deposits by Clement Reid, as well as the *dull black* ones of the *M. fontana*, and the *shining black reticulate* ones of *M. rivularis*. Mr. Druce says *M. lamprosperma* seems a quite distinct species, as in it the '*Flowers are free*' whereas they are joined, not free in the hitherto accepted British forms. The semina are very imperishable so that dried specimens on herbarium sheets can be easily needled over for ripe non-cast seeds.

2. *Orobanche procera* Koch (a form of *reticulata*, Wallroth), which grows tall upon Thistle, *Carduus eriophorus* in West Yorks., and '*Centaurea*' (?) in Lincoln at Summer Castle. It is to the obstinate acuteness of Mr. H. E. Craven, of Roundhay, who forced its non-agreement in character with *O. elatior* Sutt.,

upon my and Mr. Druce's attention, that we owe what Druce calls this 'splendid' addition to the British and York flora. It grows tall, the regularly curving trumpet-mouthed corollas are very glandulous-hairy, and massed on the upper third of the spike ; and has occurred several times of late years in the Thorner district.

3. The other species is *Arenaria stellarioides* Willd.—a colonising-alien from the Caucasus and the Euxine, probably brought first to the Halifax, and later Elland and Mirfield riparian area (1895-1908 !), along with foreign barley, but since noticed thirteen years back it has spread down the waterway of Calder. It seeds freely, branches dichotomously, has Stitchwort-like leaves, and starry, white-petalled flowers of some degree of showiness. According to Nyman, its synonym is *Arenaria cerastoides* Poiret non D.C. The *Stellaria arenaria* L., for which I took it is the *A. spathulata* Desf. *teste* Index Kewensis, a species of Spain and North Africa.

I may add that our Yorkshire Stations for the *Elecampane* want verifying.* The Wilstrop siding one had lanceolate lower leaves, the Thorp-Arch broad ones, but I write from memory—it is a quarter of a century since I saw either *in situ.* But in these matters alone, surely there is good work, and enough for our men of York to do in the coming summer—which may we all see !

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Scandinavian Britain, by **W. G. Collingwood, M.A., F.S.A.** London : S.P.C.K. 272 pp., 3/6.

This is a further volume of the 'Early Britain' Series published by this well-known house. So far the books issued comprise one of the most concise and valuable accounts of the early history of our country that we have ever read. They are all written by the leaders of the subjects dealt with. The present one is quite up to the high standard attained by its predecessors, and Mr. Collingwood's name on the title page is a guarantee of its excellence. We regret space does not enable to deal with it to the length that we should like, but we can heartily recommend it as the best account of the influence of the Scandinavian invasion that we have read.

A Hill Country, by **Russell F. Gwinnell.** 26 pp., with Geological Map. George Philip & Son, Ltd. 1/- net.

This is a charming lesson in geography and geology ; written in a way which will appeal to the numerous visitors to the northern Clyde Basin. The area in question, from its diversity of geological structure and scenery, is particularly suitable to being handled in the way the author's familiarity of the area enables him to do. It can be safely said that Mr. Gwinnell has taken full advantage of the very important lessons in the physical features of the district with which he deals ; even the place-names adding their share to his narrative.

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* My son saw it in abundance last autumn in the recorded station near the sea on the north side of the stream at Hayburn Wyke.—J. G. B.

THE SYCAMORE.

(*Acer platanophyllum*, St. L).

P. Q. KEEGAN LL.D.,
Patterdale, Westmorland.

This massy and stately tree is not a native of Lake-land, although Westmorland is far-famed for its production. In fact, as Wordsworth states, 'it has long been the favourite of the cottagers, and with the Fir, has been chosen to screen their dwellings.' It is frequently observed as an apparently spontaneous outgrowth in sundry wild and sequestered places, as well as in copses, so that we may infer that the rich gravelly soil, the hilly conditions, the open woodland, and the general climatic conditions of the northern districts are well suited to its organic temperament, and respond to the special exigences of its root growth and stem development. Its grand and massive form, the deep tones of its dense foliage, and its easy accessibility render it specially interesting to the student of the chemistry of plants, and as an introduction to that study, no better subject can be found.

Stem.—The wood is moderately hard, and of varying weight (specific gravity 0.57 to 0.74), uniformly white, and with no distinction between alburnum and duramen. The medullary rays on tangential section are pointed spindles up to about 0.7 mm. high, and 5 or 6 cells thick in the middle, the number of rays in 1 mm. of arc is about 12 ; the vessels are numerous and uniformly distributed, of 60 μ width, have spiral thickening, parts of their lateral walls are entirely inlaid with bordered pits, while their slanting transverse walls are pierced by simple pores ; the fibres have very stout walls, beset with a few simple pits ; some parenchyma occurs alongside the vessels.

In the bark the parenchyma forms tangential bands intermixed with sieve-tubes which have a watery 'latex' ; the fibres are disposed in the inner bast in a few narrow concentric layers extending between the rays, and almost all the parenchyma cells adjacent to these layers contain a single crystal of oxalate of calcium, while the outer bast and inner cortex are thickly sprinkled with groups of stone-cells richly provided with similar crystals ; the pericycle forms a somewhat interrupted ring of fibres separated at intervals by sclerenchyma ; the periderm of rather wide cells is formed in the first year in the subepidermal layer, and remains thin and living for a long time, till finally plates of secondary periderm develop below it, and ultimately produce a nearly smooth, hard, dry, chocolate-coloured rhytidome, which eventually splits and peels off in scales. The Sycamore is a starch-tree, *i.e.*, while the starch completely disappears from the bark in winter (mid-November till 3rd March), that of the wood remains only slightly reduced in quantity all the time. A piece of branch 2½ inch in diameter, felled in February, was examined : the dried bark had a small quantity of white wax with traces of carotin and chlorophyll, there was no resin apparently, the amount of tannin was under 1 per cent., there was a little free phloroglucin, a little pectosic mucilage, and free phlobaphene, a saponin-like glucoside, some cane-sugar, about 10 per cent. oxalate of calcium, and 9.4 ash which had 6.6 per cent. soluble salts, 4.4 silica, 45.2 lime, with traces of magnesia, etc. ; the wood showed mere traces of tannin and phloroglucin, and (air-dried) yielded about 0.5 per cent. of ash, which had 32.3 per cent. soluble salts, 4.4 silica, 21.5 lime, 8.7 magnesia and manganese, 3.9 P^2O^5, and 3.9 SO^3. It would seem that none of our ordinary well-known timber or coppice trees yields a chemical analysis quite so meagre as the foregoing. Even none of our sap-wood trees is apparently so poverty-stricken as respects wax, resin, tannin, etc. It is clear that the starch reserve of the Sycamore is for a very long period in life utilized by the cambium for growth in size, and for the evolution of new-shoots, but that it is easily exhausted and spent in the prosecution of this work. Herewith is connected the remarkable production of cane-sugar in the bleeding sap of springtide—the increased tension (osmotic pressure) thereof arising concurrently with the regeneration of the starch in spring, but the outflow effect would be comparatively insignificant if it were not for the remarkable porosity of the vessels and their freedom from obstructive accumulations of gum (xylan), resin, and tylose growths.

Leaves.—The mesophyll is composed of one long layer of palisades, narrow, and occupying about half its thickness, and a lacunar tissue of irregular cells with large air-spaces ; the cells of the upper epidermis contain starch granules, and their inner wall is slimed, the lower epidermis has on the surface a papillose structure, and is coated with wax, the stomatic cells only bearing starch, while simple one-celled hairs appear along the course of the nerves; the stomata are of medium size, and have no accessory cells, but are very numerous, their number per square mm. being about 400; the leaf is about 165 μ thick; at the base of the petiole the separated vascular bundles form a closed ring, from which nearer the blade other bundles are emitted, making 7 in all. On 8th August the blades held 67 per cent of water, and the dried substance contained 3.5 per cent. wax, with very much carotin, but very little resin or fat oil, 19.8 albumenoids, 3.4 quercitrin and tannin, some free phloroglucin, and glucose, a moderate quantity of pectosic mucilage stained with phlobaphene, no reserve starch (very much in the fresh leaf), much oxalate of calcium, and 11.2 ash which had 26.2 per cent. soluble salts, 14.9 silica, 26.4 lime, 5.8 magnesia, 5.3 P^2O , and 4.4 SO^3, there were some manganese and soluble carbonates. The ash of the brown autumn leaves (with petioles) amounted to 12.1 per cent. with 20.7 per cent. silica, 41.9 lime, and 1.1 P^2O^5. The leaves contain inosite, according to Fick. The special feature, however, is the lavish plaster of wax on the lower epidermis, which rapidly separates from boiling alcohol in gelatinous masses; its formula would be near $C^{26}H^{16}O^4$. The early cessation of the foliar vegetation in this species of Maple forbids any exhibition of the magnificent crimson autumnal colouration so admirably beautiful in some of its congeners.

FLOWER AND FRUIT.—The inflorescence assumes the form of a pendulous cluster (raceme) which exhibits every gradation from hermaphrodite flowers with large ovaries to those in which the ovaries are reduced or entirely absent. The pistil consists of two carpels joined to form a flattened two-chambered ovary, with two ovules in each chamber. The floral parts contain no carotin, but have much quercitrin and glucose (the disc glistens with drops of nectar), while the ash of the whole thryse yields 48.5 per cent. soluble salts, 14.1 lime, 3.8 magnesia, 12.4 P^2O^5, 6 SO^3, with traces of chlorine, magnanese, etc. In the fruit, which is a double samara (winged achenes), one ovule in each chamber enlarges to a rounded seed, which is wholly occupied by the embryo, and fills up the globular chamber; the ripe seed is made up of an external tegument (testa) composed of a cuticle, two layers of thin cells, a compressed membrane, and a layer of cells with crystals of oxalate of calcium, also of an internal tegument (tegmen) of five rows of cells; a refractive plate, which is the relic of the absorbed

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nucellus, immediately borders the foliaceous wrinkled cotyledons; there is no endosperm; it ripens in September, and about half of the seeds produced are fit to germinate up till two years. The whole fruit contains about 8 per cent. of water, 26 albumenoid, 8 to 10 fat-oil, 2 sugar, 9.5 fibre, considerable resin and oxalate of calcium, 5.5 ash, which has 37 per cent. soluble salts, 2.6 silica, 25.7 lime, 4 magnesia, 8 P^2O^5, and 3.6 SO^3. The reserve materials are aleurone and oil, no starch. When the fruit covers are transparent, so that light can easily enter into the deepest parts of the seed, then a dense homogeneous protoplasm, coloured uniformly green, fills the cells of the embryo. This green pigment was formerly thought to be chlorophyll, but it is doubtful if this seed-green is really identical with or related to leaf-green.

SUMMARY.—There is some similarity between the physiology of the Beech and that of the Sycamore, but in the latter we have to deal with a case of palmate nervation of the leaves. With regard to these organs, we have all the chemical evidence of rapid growth and early decline. The production of starch declines towards the autumn, that of cellulose does not increase, and complete lignification is not consummated till the fall; the albumenoids and the sugars remain uniform till very late, and there is a heavy fixation of ash with much silica and lime in the old leaf. A special feature is the large quantity of wax coating on the lower epidermis, the cause of which is difficult to assign, but is doubtless connected with a decline of the vitality on that side of the organ. The transpiratory activity is only moderate, and the assimilatory energy is not as great as the sombre green of the foliage would seem to indicate. As regards the stem, the thickness of the liber relatively to that of the wood in older trees is comparatively feeble, which is a sign of defective differentiation; and notwithstanding that the wood is very fibrous, the lignification of that particular element is very slow, and not completed up till about 80 or 100 years. Moreover, the felled timber is liable to rot when exposed to atmospheric variations—a circumstance which is attributable to a serious deficiency of tannin and resin. However, notwithstanding all these grave drawbacks, the Sycamore manages to endure well and hearty for over two hundred years. That it somehow maintains a remarkable soundness of main body and limb is clear from the fact that it is not subject to maladies like gummosis, or to a partial demise of any of its twigs and young branches like the Poplars, etc. Year after year with unfailing energy, its magnificent crown rears a majestic arch, and projects a solemn shade ; its flowering and fruiting are annually abundant, and fully sustained ; and the gaping wounds left by the lopping of its larger limbs are healed up and overgrown with marvellous celerity and completion.

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FRESHWATER RHIZOPODS FROM THE SHEFFIELD DISTRICT.

JAMES M. BROWN, B.Sc.

The Freshwater Rhizopods, though an extremely interesting group of microscopic animals, do not appear to receive the attention which they deserve. They are to be found very commonly, and in almost all kinds of fresh water ; in the sediment of ponds and streams and water-troughs ; amongst the floating conferva and weeds ; and amongst wet moss. One needs but to collect samples of sediment, weeds and moss in the field, and on arriving home rinse these in clear water and strain the washings through fine gauze. The sediment so obtained will be found to yield numerous species. Sphagnum washings are especially productive, and I have found many forms amongst the green growth on the overflow from water-troughs. The material can be preserved in a healthy state for a considerable time in shallow vessels exposed to dull light, and loosely covered to prevent too much evaporation.

The following species I have found recently in this district, and they will serve as a preliminary list of the most commonly occurring forms.

Order I.—AMOEBINA—naked forms.

Family LOBOSA.

Amoeba proteus (Pallus) Leidy. The 'common' *amoeba* occurs frequently in sediment of pools and streams, and amongst aquatic vegation. Burbage, Stanage, Ringinglow, etc. A large form—probably Cash's var. *granulosa*—in a stream in Ecclesall Woods.

Amoeba villosa Wallich. Common, and generally in similar situations to the previous species.

Amoeba striata Penard. A form with a distinct external pellicle. Amongst the mossy growth on the over-flow of water-troughs. Ecclesall, etc.

Amoeba limax Dujardin. A small form. Occurs in sediment of pools. Ringinglow and Ecclesall Woods.

Amoeba limicola Rhumbler. Occasionally found in sediment of pools. Ringinglow.

Amoeba verrucosa Ehrenb. A form with external pellicle. According to Penard, a collective term for several distinct species. Amongst mossy vegetation. Ecclesall and Bamford.

Amoeba actinophora Auerbach. A very small species, but highly interesting. Occasionally in sediment. Whiteley Woods and Ecclesall.

Dactylosphaerium radiosum (Ehrenb) Bütschli. A small form occurs in sediment (Ringinglow) and amongst floating conferva (Wye at Haddon), etc.

Family VAMPYRELLIDA.

Vampyrella lateritia (Fresen.) Leidy. A peculiar form parasitic on *Algæ*. Burbage.

Vampyrella vorax Cienkowski. A non-parasitic and active species, feeding on Diatoms, etc. Amongst mossy growth on water-troughs. Ecclesall.

Order 2.—CONCHULINA. Forms provided with tests.

Family ARCELLIDA.

Arcella vulgaris Ehrenb. A very common species amongst aquatic vegetation.

Var. *compressa* Cash is rare. Occurs in Sphagnum pools, Ringinglow.

Arcella discoides Ehrenb. Amongst Sphagnum. Ringinglow and Stanage.

Pseudochlamys patella Clap. et Lachm. A curious form with very delicate flexible test. Occurs on dripping rocks amongst moss at Slippery Stones (Derwent). Mid-winter.

Centropyxis aculeata (Ehrenb.) Stein. Common amongst sphagnum and in pools.

Var. *ecornis* (Ehrenb.) Leidy, generally with the above.

Difflugia pyriformis Perty. Common in pools, troughs, and amongst aquatic vegetation. Very variable.

Var. *compressa* (Carter) Leidy. Fairly common in similar situations. Stanage, Froggatt, etc.

Difflugia acuminata Ehrenb. Common in sediment. Test often consists entirely of diatom frustules (=*D. bacillarium* Perty. Ecclesall Woods. Froggatt, etc.

Difflugia globulosa Dujardin. Common. Ecclesall Woods, Ringinglow, etc.

Difflugia urceolata Carter. Not common. Sediment of water-trough, Froggatt.

Difflugia constricta (Ehrenb) Leidy. Common in pools.

Lecquereusia spiralis (Ehrenb) Schlumb. A form with an apparently coiled shell. Generally common. Stanage, Froggatt, Ringinglow, Occasionally the test consists of angular sand grains. (Ecclesall Woods).

Nebela collaris (Ehrenb) Leidy. A common form in Sphagnum. Froggatt, Ringinglow, etc.

Nebela flabellulum Leidy. Less common, but in similar situations. Froggatt.

Quadrula symmetrica Schultz. Common in pools. Froggatt, Stanage, etc.

Quadrula irregularis Archer. Amongst mossy growth on water trough. Ecclesall.

Cochliopodium bilimbosum (Auerb) Leidy. Occurs associated with the last form at Ecclesall.

Family EUGLYPHINA.

Euglypha alveolata Dujardin. A common form and widely distributed. Both spined and unspined forms occur in most situations.

Euglypha ciliata (Ehrenb) Leidy. Also common in sediment and amongst aquatic plants. Ringinglow, Froggatt, Stanage.

Assulina seminulum (Ehrenb). A few empty tests amongst Sphagnum. Ringinglow and Burbage.

Cyphoderia ampulla (Ehrenb) Leidy. Common and widely distributed in sediment and amongst vegetation in pools. Ringinglow, Burbage, Ecclesall Woods, etc.

Sphenoderia lenta Schlumb. A few empty tests amongst Sphagnum. Stanage.

Trinema enchelys (Ehrenb) Leidy. One of the most widely dispersed forms, very variable in size.

Pamphagus mutabilis Bailey. Many associated together amongst floating Alga. Burbage. A form with very delicate flexible test.

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? *Pamphagus curvus* Leidy. Several individuals associated with the above appear to correspond to this species.

Family AMPHISTOMINA.

Diplophrys archeri Barker. A few individuals amongst the mossy growth on the outside of a water-trough. Ecclesall.

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BEETLES OF LANCASHIRE AND CHESHIRE.*

E. G. BAYFORD, F.E.S.

It is safe to say that no Coleopterist in the North of England can afford to be without this list for purposes of comparison and reference, or to guide him in his studies, whether or not it be his fortune to visit any of the localities named in it. The total number of species recorded for the two counties is 1486. That this is very much below the actual number of species which go to make up their beetle fauna is obvious, and Mr. Sharp himself apparently recognises this, for he admits in his introductory remarks that 'nearly the whole of Lancashire, north of the Ribble, the mountainous districts in the east of that county, and the whole of South and East Cheshire are still virtually unexplored, and probably, especially in the upland districts, maintain a fauna only very partially represented in the median and western plain.' Elsewhere, however, he apparently overlooks this very obvious explanation, and attributes this paucity to be due to the geographical position of Lancashire and Cheshire. We cannot avoid thinking that the absence from both counties of regular systematic work, such as has been organised and directed in Yorkshire by the Yorkshire Naturalists' Union, is more likely to be the true explanation.

The division of each county into suitable areas, and making an excursion into some part of each every year, with the express purpose of recording its entomological fauna, may well be taken up by the Lancashire and Cheshire Entomological Society. So far as the beetle fauna is concerned, we should anticipate an addition of from 250 to 300 species. When some such plan as this has been tried and has failed, it may then be politic to explain poor results by a reference to geographical position.

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* 'The Coleoptera of Lancashire and Cheshire;' by W. E. Sharp, F.E.S. St. Albans, 1908, 76pp.

Mr. Sharp pays a well-deserved tribute to the self-denying zeal of the working-men naturalists, who did such splendid work in the first half of last century. Unfortunately, these early naturalists had not realised how important the study of distribution would become. Consequently for the purposes of a list, their collections, if still in existence, furnish little or no assistance. Coleopterists are rarely numerous in any county, but Lancashire and Cheshire appear to have had less than the average number. We demur to the inclusion of Samuel Gibson, of Hebden Bridge, who by residence and by the collecting he did around Huddersfield, Halifax and Hebden Bridge, may, in fairness be claimed by Yorkshire Coleopterists as one of themselves. On the other hand, we miss the name of Rev. H. Higgins, who first discovered *Cymindis vaporariorum* L. in Lancashire ; and of T. Blackburn of Bowdon. We find that Mr. Sharp has omitted a number of records of species which appeared in the older lists, *e.g.*, Mr. Gregson recorded *Blethisa multipunctata* L., from Crosby, *Pelophila borealis* Payk. from Bromborough, and *Pelobius tardus* Herbst. from Rufford ; and Dr. Ellis recorded *Platynaspis luteorubra* Goeze. from Hightown.

An important omission is that of *Mordella fasciata* F., a specimen of which taken by Rev. H. H. Higgins at Rainhill was stated by Dr. Ellis in 1886 to be then in the Derby Museum, Liverpool. This discounts considerably Mr. Sharp's remarks on the genera *Mordellistena* and *Mordella.*

On the contrary, we are pleased to see that Mr. Sharp has re-instated *Lampyris noctiluca* L. on the authority of three Coleopterists and his own. It was first recorded by Mr. Gregson ' in plenty on the clay banks beyond New Ferry,' but despite this definite record, Dr. Ellis omitted it from his list, for the insufficient reason that he himself had not met with it. Notwithstanding the fourfold confirmation, Mr. Sharp makes no mention of this early record.

Another point which we should have liked Mr. Sharp to have settled once for all is the occurrence of *Helophorus mulsanti* Rye. He merely says ' Fowler records this species as taken commonly at Liverpool by Crotch, but it is otherwise unrecorded from the district.' This, however, is not the case. Dr. Ellis records ' one specimen from the Hightown shore, May 1882.' F. Archer says of it : ' abundant in the ditches Altcar rifle ground. This is also new, being distinct from *H. dorsalis* Marsh.' The latter species he does not record, and yet in the face of his definite statement as to the distinction between *H. dorsalis* Muls. [= *H. mulsanti* Rye.] and *H. dorsalis* Marsh, Dr. Ellis, without the slightest justification, transferred Archer's record of the former species to the latter. Now, there may be good reasons for disregarding Archer's definite statement and the records of Crotch and Dr. Ellis, with which must go the authority of E. C. Rye, who presumably satisfied himself that Archer and Crotch had rightly diagnosed the species. If such there be, we submit that Mr. Sharp should have given them, so that we might have considered them for ourselves, and accepted or rejected the conclusion to which he appears to have come. It may be added that Mr. Sharp omits *H. dorsalis* Marsh for which the only record is the improper one of Dr. Ellis, referred to above.

Despite what we have said, this list marks a great advance on the restricted list of Dr. Ellis, which only enumerated some 850 species, and Mr. Sharp deserves our thanks for its compilation. If our suggestion as to organised excursions, etc., be adopted, and an accession of species be the result, we shall look to him to furnish us with a fuller and more complete list which will be exhaustive in its inclusion of previously recorded species and at the same time scientifically critical as to their right to a place in the list.

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Waterloo Museum, Liverpool. Complete History of the Echalaz Collection. By **Lieut. Col. Echalaz.** Croydon. 325 pp.

This excellent and well-printed volume is a detailed description of the collection of British Birds, etc., recently presented to the Waterloo Museum by Lieut-Col. Echalaz. Printed in large type, and on thick paper, the first impression one gets is that it puts the publications of our national museum at South Kensington in the shade! There are seventy cases in the collection, and these are described to some length. In each instance, particulars of the capture of the bird are given, with other general information, admittedly extracted from Saunders' 'Manual of British Birds.' Most of the specimens are the victims of the gallant colonel's gun, but with regard to the Great Northern Diver, there is an exception to this rule. With this wary bird the Colonel had not his characteristic luck—one shot fell about an inch too short of the bird, and he believes he wounded another. The colonel appears to have always been a sportsman. At the age of twelve he was allowed a single-barelled gun, and at fourteen, he shot his first hare, and first pheasant. There is a portrait of the Colonel as frontispiece, and his life-history is given in the first chapter. In this he deplores the fact that he was never in active service, but he trusts that, as he had faced a wounded tiger, he would have acquitted himself both as a soldier and an Englishman, had he been called upon to face the bullets of any enemy. Personally, we feel rather glad, for his sake, that he was not called upon to 'face bullets'; we should not imagine it at all a pleasant proceeding. There are several plates from photographs of the cases, many of which are good; but some, we hope, hardly do justice to the specimens.

FIELD NOTES.

MAMMALS and BIRDS.

Otter and Kingfisher at Horncastle.—In the Canal which runs through the town of Horncastle, an Otter has recently been seen disporting itself at the end of a stonemason's yard, and within a few feet of his work-shop. At the writer's oft-repeated request, it was not disturbed, and occasionally lay on the bank in full view. At the same place a Kingfisher (now also undisturbed), has been frequently seen during the last two years, diving for food. Can there be any connection between these two incidents ? The mason says that there are shoals of small roach or dace about this part of the canal.* On one occasion an unfortunate Kingfisher rose from his dive with such impetus, that he struck against the brick wall bordering the water, and was killed. — REV. J. CONWAY WALTER, Langton Rectory, Horncastle, December 16th, 1908.

A Birdland Tragedy.—Early in December last, a painter brought me the mummified body of a Swift, which he had found in a hole under a spout. Apparently the bird had somehow or other managed to become entangled in a piece of cord, and hang itself. I sent the bird over to a meeting of the Bradford Naturalists' Club, and they, with their usual thoroughness, held a post-mortem examination, and what appeared to be a lot of string, turned out to be a portion of a lady's veil. This had been tightly twisted round and round, and had gathered an external coating of dirt and soot, which gave it the exact appearance of thick string. Attached to the veil there were three or four inches of ordinary garden wire netting.

By a method of deduction we get a probability something like the following :—A veil blew from a lady's hat, and caught in some wire netting, and waving in the breeze, took a Swift's fancy for nesting material. All might have gone well if the piece of wire had not become fixed near to the entrance of the nesting hole. A few struggles with it caused the veil to twist round the bird's neck and foot. Then a series of struggles to get free must have resulted in the bird putting such an amount of twist into the veil, that it became tightly drawn, and the bird died of exhaustion in the hole. It is noteworthy that the bird in its struggles to get free must always have turned one way, thus giving the veil such a "hard twist," that it resembled string.

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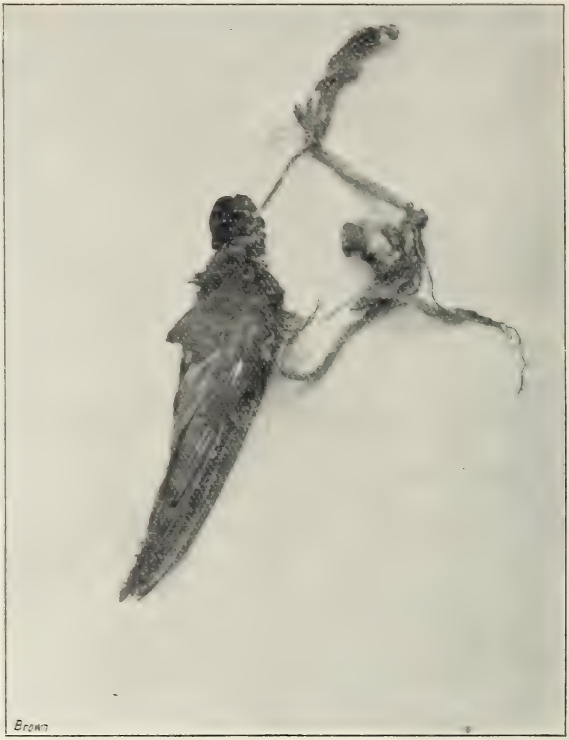
* The abundance of food has no doubt attracted both the Otter and Kingfisher.—EDS.



After the post-mortem, the body was decently interred in the Cartwright Museum, Bradford.—R. FORTUNE, Harrogate.

Honey Buzzard in Northumberland.—Whilst rambling in Whittle Dene, Ovingham-on-Tyne, with a friend on Sept. 25th, 1908, we found a large bird, still alive, but in a feeble condition. It died after being removed to our house. After skinning and setting it up, it was identified by the Hancock Museum authorities at Newcastle, as a Honey Buzzard. The bird had evidently been fasting, for it was very thin, and hardly weighed much more than a pound.—DOUGLAS CLAGUE, Newcastle-on-Tyne.

ORTHOPTERA.

A Cockroach new to Yorkshire.—Last August, Mr. Malone kindly gave me a large Cockroach from the Bradford market, which was altogether new to me. I sent it on to Mr. R. Shelford, of the Oxford Museum, who kindly named it *Nyctibora brunnea* Thunb. It is a South American species. Of course it is 'only an introduction,' but we must bear in mind that all our big cockroaches have been introduced with commerce. Some of them, however, have come to stay; have found congenial habitations, and have multiplied enormously. It is therefore of interest and importance to know the time of their coming.—J. W. CARTER, Bradford.

***Leucophœa surinamensis* Linn. at Bradford.**—In 1906 I had a specimen of this Cockroach brought in from the Bradford market. During 1907-8 Mr. F. Rhodes gave me several from a hot-house in Lister Park, Manningham, where it has become firmly established.—J. W. CARTER, Bradford.

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MOLLUSCA.

***Vertigo alpestris* at Ingleton.**—The members of the Leeds Branch of the Conchological Society held a joint ramble with the members of the Manchester Branch, at Ingleton, on the 12th September, 1908. Thirty-six species of landshells, and nine slugs were recorded during the day. Mr. J. W. Taylor was fortunate in adding a second authentic locality for *Vertigo alpestris.* This species, and *Vertigo minutissima* are the most uncommon of the genus that are known to occur in Yorkshire. It is interesting to add another locality to the very few already known for these rare species. It is perhaps as well to state that it occurred under stones on the top of a wall in Beesley Glen. This appears to be the general habitat for this species, as it is found under similar conditions in other localities. It was first recorded from a garden wall at Bingley, by Mr. J. A. Hargreaves in 1887.—F. BOOTH.

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BOTANY.

The Hybrid Oak in Yorkshire and other parts of Britain.—There appears to be no definite record of the occurrence of the Hybrid Oak (*Quercus Robur* × *sessiliflora*) in Britain. During the summer of 1908, I found it in the following

Watsonian vice-counties:—west Kent, Cambridge, Chester, west Lancaster, south-west Yorkshire, and Westmorland with North Lancashire. Dr. W. G. Smith and Mr. A. G. Tansley gathered some specimens of Oaks in North-East Yorkshire last June, and these were examined by Mr. Tansley and myself: among the specimens were one or two of the Hybrid Oak. Mr. W. M. Rankin has forwarded me specimens, a few of which belong to the Hybrid, from a locality in mid-west Yorkshire. Mr. Tansley also reports to me the finding, in June 1908, of the Hybrid Oak in Hereford and Worcester. Herbarium specimens which I have examined, prove its occurrence also in Sussex, Bedford, Derby, Dumbarton, and Perth. I am very shortly publishing elsewhere an account of the characters, status, and distribution of all the British Oaks.—C. E. Moss, Cambridge.

Transactions of the Rochdale Literary and Scientific Society. Vol. IX., 1905-1908. 114 + xxxiv. pp.

This record of this Society's work for the last four years is a good one, and contains many useful papers. Perhaps that which will appeal to our readers the most is on 'Fossil Arthopoda and Pisces from Middle Coal Measures of Sparth, Rochdale,' by William A. Parker. In this the author enumerates the various finds made from time to time in the now well-known ironstone nodules in the shales at Sparth Bottoms. The paper is illustrated by representations of the more interesting fossils found. There is a paper on 'Manchester's contribution to the Chemistry of the Nineteenth Century,' by J. H. Brittain; 'Marine Shells: their Variety and Beauty,' by Rev. A. Hann, and 'The Underground Waters of Rochdale and Neighbourhood' (with analyses), by T. Stenhouse. There are also exceedingly useful papers on such subjects as Rochdale Newspapers, the Meteorological Elements of Rochdale, Two Reputed Manor Houses of Rochdale, Inscriptions on Rochdale Gravestones, etc., as well as others of a purely literary character. This Society is obviously doing excellent work in its district, and, in its Transactions are preserved many important communications.

Animal Romances, by **Graham Renshaw, M.B., F.Z.S.** London: Sherratt & Hughes. 206 pp., 7/6 net.

Some little time ago in noticing this writer's 'Final Natural History Essays,' we expressed the hope that they might not be 'final.' This hope has been realized, and we can safely say that 'Animal Romances' is even more interesting than its predecessors. It consists of a series of essays, written first-hand from actual studies in the field, in this way shewing a marked contrast between many, very many 'natural history' books that are now being placed upon the market. The present volume deals not so much with the zoology and history of the mammals, as with Dr. Renshaw's previous books, but in the present case the author has attempted to present the animals as actually living and moving before the reader. Dr. Renshaw now deals with elephants, giraffes, hippopotamus, eland, jackals, penguins, etc., etc., and the essays are written in a style and with a literary 'finish' that is quite refreshing. The only fault we have to find with the volume is the increase in the size of its pages, the actual letterpress being the same as in previous volumes, though this may have been done to better accommodate the many excellent plates.

THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

(PLATES V., VI. and VII.).

WM. WEST, F.L.S.,
AND
G. S. WEST, M.A., D.Sc., F.L.S.,

I.—INTRODUCTION.

During an investigation of the British freshwater phytoplankton, material has been collected on several occasions from the various lakes of the English Lake District. These collections were made as part of a general comprehensive scheme for the investigation of the plankton of the British lakes. We have been enabled to carry out this research during the last few years, chiefly by means of several grants from the Government Grant Committee of the Royal Society.*

The general Alga-flora of the English Lake District is fairly well worked out. The earliest paper of importance was a list of Desmids found in the neighbourhood of Windermere by Bissett,† and this was followed by two papers by A. W. Bennett.‡ We have ourselves explored the greater part of this area very thoroughly for Algæ of all kinds, and have at different times contributed papers dealing either exclusively or partially with the Algæ of the English Lake District.||

The first collections of plankton were made in June 1903, and we had the advantage of beginning this plankton investigation after having previously acquired a very complete knowledge of the general Alga-flora of the bogs, streams, pools, and lake-margins. This has enabled us to thoroughly appreciate the differences between the phytoplankton and the general Alga-flora, and to endeavour to find out something concerning the existing relationships between them.

Considering the size of some of the English lakes, they are situated in a very compact area, the whole of which is incor-

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* A general summary of this work, treated largely from a comparative standpoint, has quite recently been presented to the Royal Society.

† J. P. Bissett, 'List of Desmidieæ found in gatherings made in the neighbourhood of Lake Windermere during 1883,' Journ. Roy. Micr. Soc.' 1884.

‡ A. W. Bennett, 'Freshwater Algæ of the English Lake District, etc.', 'Journ. Roy Micr. Soc.', 1886; 'Freshwater Algæ of the English Lake District, II.', *ibid.* 1888.

|| W. West, 'Algæ of the English Lake District,' 'Journ. Roy. Micr. Soc.,' 1892; W. and G. S. West, 'New British Freshwater Algæ,' *ibid.* 1894; W. and G. S. West, 'Notes on Freshwater Algæ, II.', 'Journ. Bot.', XXXVIII., 1900; III., *ibid*, XLI., 1903, etc.

ated within a radius of about 15 miles from a centre, taken at Dunmail Raise (about half-way between Grasmere and Thirlmere). Within this area many high mountains are embraced, four summits being over 3000 feet, and four others exceeding 2900 feet. In all, there are more than forty mountains over 2000 feet in height in this small area.

The lakes are numerous, and ten or twelve of them are moderately large, although rather narrow, Windermere having a length of over ten miles, Ullswater a length of over seven, and Coniston Water a length of over five miles. There are at least a dozen more smaller lakes, no less important than the larger ones from an algological standpoint, and in addition, a considerable number of mountain tarns.

As might be expected in a western mountainous region, the *rainfall* is very heavy, varying from about 50 inches in the outer zone, to about 150 inches in the more central region of the highest mountains. The rainfall at Seathwaite at the upper end of Borrowdale, is the heaviest in the British Islands, and is only approached by that registered in the Cullin Hills in Skye. This heavy rainfall, and the frequent torrential character of it, is no doubt responsible for washing many of the bog species of Algæ into the plankton, and affords an explanation of the presence of certain species in the limnetic region of the lakes.

We have already pointed out the important relationship between the geological character of a district and the constituents of its Alga-flora, more especially of its Desmid-flora.* The entire Lake District is an Older Palæozoic area, in which a northern outcrop of Ordovician strata is separated from a southern Silurian outcrop by an extensive mass of pre-Devonian igneous material. The *really rich* Alga-floras are all on the Older Palæozoic or Precambrian areas, and the English Lake District possesses a richer Alga-flora than any other part of England, although not quite equal to that of the north-west of Scotland or the west of Ireland. The phytoplankton of the lakes is similarly rich in species, although not so prolific as the limnetic flora of the lakes of north-west Scotland.

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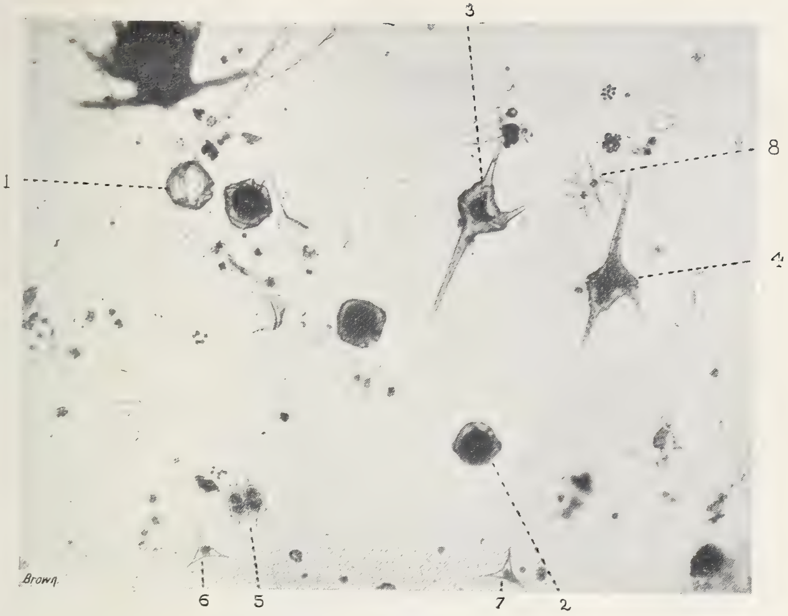
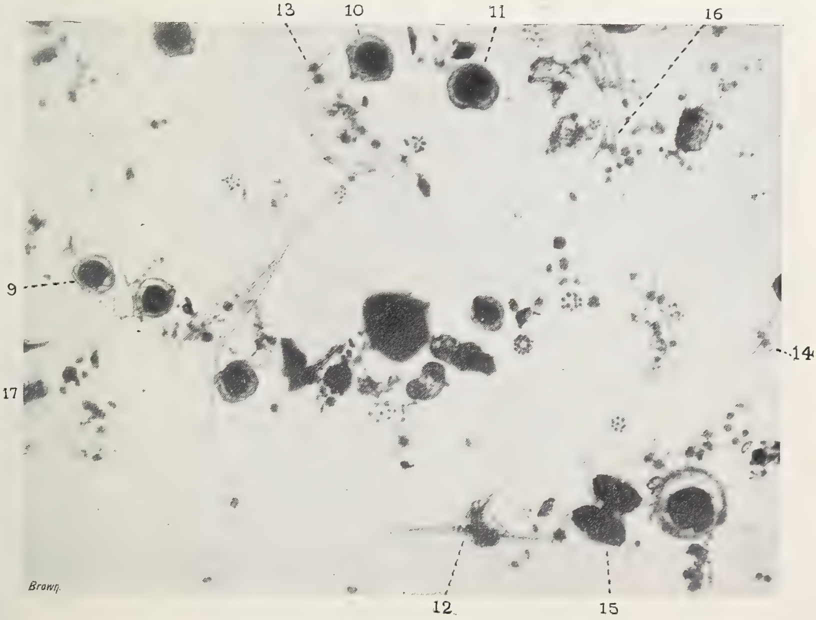
* W. and G. S. West, 'Alga-flora of Yorkshire,' 'Trans. Yorks. Nat. Union,' V., 1900-1901, p. 5; G. S. West, 'Treatise on British Freshwater Algæ,' Cambridge, 1904, p. 6; W. and G. S. West, 'A further Contribution to the Freshwater Plankton of the Scottish Lochs,' 'Trans. Roy. Soc., Edin.', XLI., Part III., 1905, p. 511.



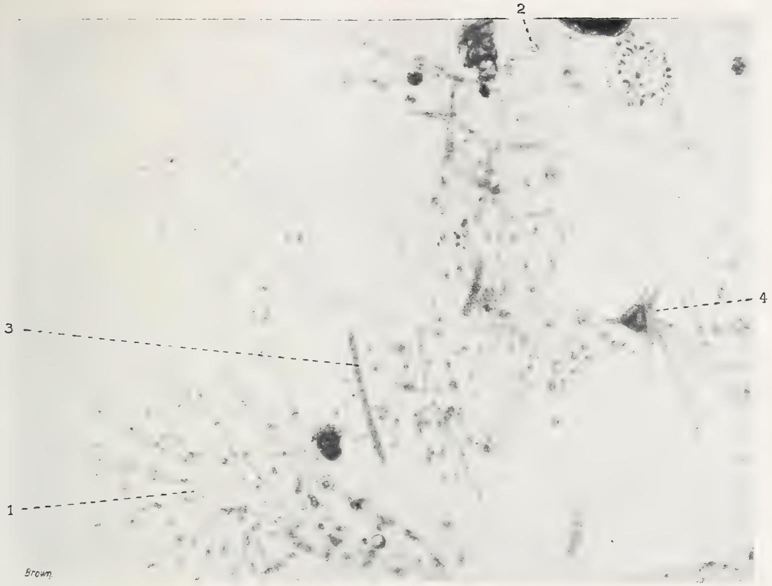
Ennerdale Water (x 100).



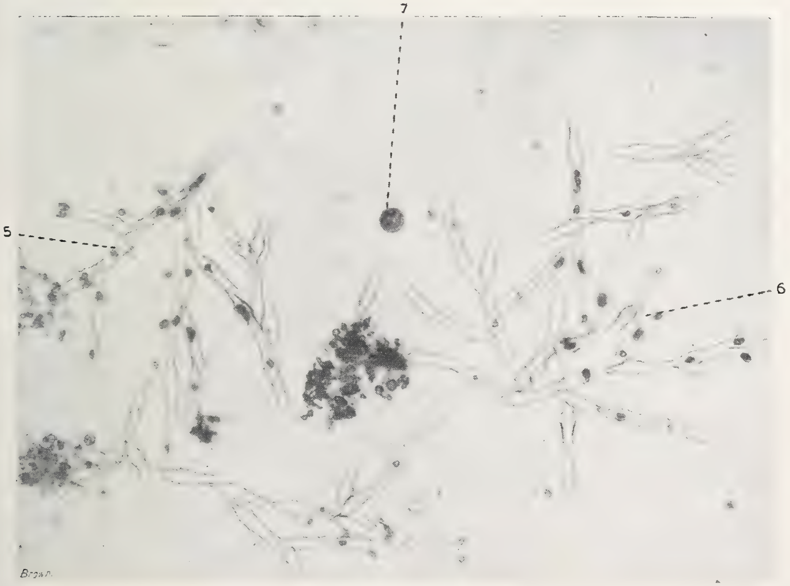
Ennerdale Water (x 100).

FRESHWATER PLANKTON.

BRITISH M
NATURAL HISTO



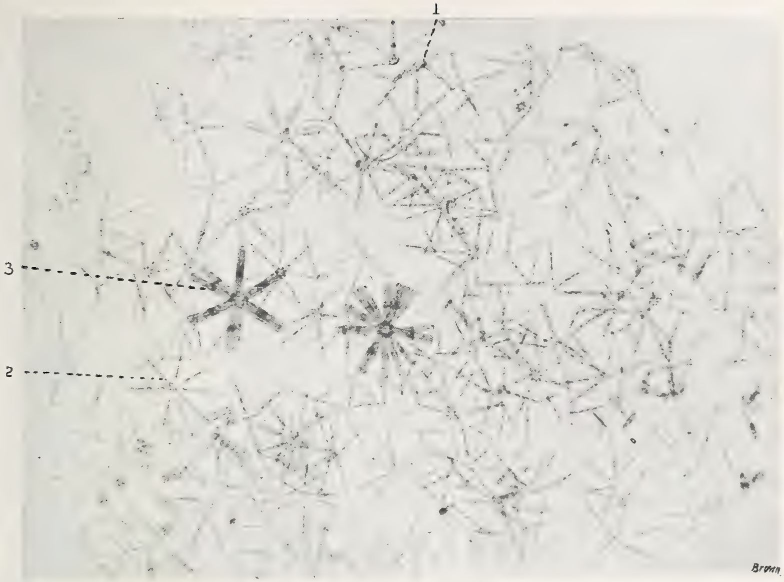
Crummack Water (x 100).



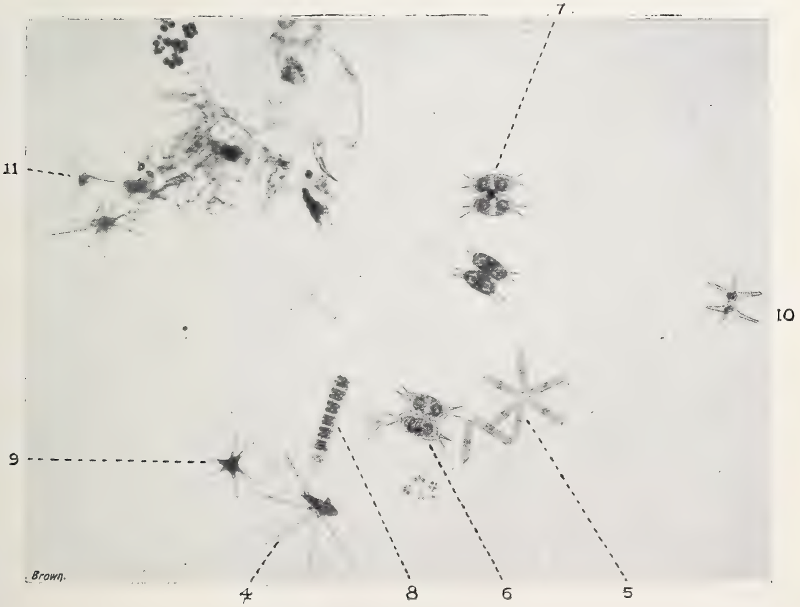
Derwent Water (x 200).

FRESHWATER PLANKTON.

BRITISH MUSEUM NATURAL HISTORY



Windermere (June). (x 100).



Windermere (Sept.). (x 100).

FRESHWATER PLANKTON.

BRITISH M
NATURAL HIST

In all, eighteen lakes were examined for their phytoplankton, the tow-netting being done by boats wherever they were available. Where boats could not be obtained, the plankton-collections were made either by the tedious process of baling a large volume of water through the nets, or by allowing the water of the outlet to flow through the nets for some time, The nets used were such as we have described before, and consisted of the strongest silk bolting-cloth, with a very close and uniform mesh (170 meshes in a linear inch).

We have quite recently been receiving regular monthly collections from Windermere, Wastwater, and Ennerdale Water, in order to obtain an adequate idea of the periodicity of the various constitutents of the phytoplankton of three representative lakes. As yet, only the Windermere collections are complete for twelve months, and a separate section of this paper is devoted to their consideration.

II.—DETAILED ACCOUNT OF THE LAKES EXAMINED.

General Notice of the Lakes Investigated. The dates are those on which the plankton-collections were made.

1. *Buttermere, Cumberland.* May 1903. Altit. 331 feet. About one and a quarter miles long, by three-eighths of a mile broad. Average depth about 55 feet; maximum depth, 94 feet. The lake is in the midst of mountains, and lies quite away from any village. The plankton contained a few good Desmids and a quantity of *Peridinium Willei. Tabellaria fenestrata* was the most conspicuous of the Diatoms, and of the Rotifers, *Notholca longispina* was abundant.

2. *Crummock Water, Cumberland,* May 1903. Altit. 321 feet. About two and a half miles long, by five-eighths of a mile broad. Average depth, 88 feet; maximum depth, 144 feet. The lake is in the vicinity of high mountains, one summit having an altitude of 2791 feet, being distant less than one mile. There are no villages in the vicinity, and therefore little contamination of the water. The plankton collected could be described as a Dinobryon-plankton. The dominating species was *Dinobryon cylindricum,* and with it was a quantity of *Cœlosphærium Kützingianum.* Theoonly conspicuous Diatom was *Melosira granulata.* Of the Chlorophyceæ, *Ankistrodesmus Pfitzeri* was quite common, a sterile species of *Mougeotia* with very long cells was frequent, and a number of Desmids were of general

occurrence. The most noticeable of the latter were *Cosmarium abbreviatum* var. *planctonicum, Xanthidium antilopæum* var. *depauperatum, Staurastrum furcigerum* forma *eustephana,* a form of *St. anatinum, St. Arctiscon,* and *Spondylosium pulchrum* var. *planum.* A few of the larger Entomostraca were present, and also a few Rotifers, of which *Notholca longispina* and *Polyarthra platyptera* were the most frequent, the latter occurring in considerable quantity.

3. *Ennerdale Water, Cumberland.* May 1903. Altit. 369 feet. Two and a half miles in length by three-quarters of a mile broad. Average depth about 62 feet; maximum depth 148 feet. The lake has a somewhat desolate situation, and only two or three houses are near it. It is the most western of the lakes, and lies between mountains which rise on each side to 2000 feet. It has a separate drainage basin, not being connected with any of the other lakes of this area, and the valley above it is strewn with numerous moraines. The plankton was dominated by *Peridinium Willei,* and numerous Desmids. *Ceratium hirundinella* was also common. The smaller species of Desmids were very abundant, the most conspicuous being *Gonatozygon monotænium, Staurastrum lunatum* var. *planctonicum, St. dejectum, St. curvatum,St. jaculiferum, Arthrodesmus triangularis, Cosmarium subarctoum,* and *C. bioculatum.* The most interesting of the larger Desmids were *Cylindrocystis diplospora* var. *major, Micrasterias Sol, M. pinnatifida, Cosmarium connatum, Staurastrum furcigerum, St. Arctiscon, St. longispinum,* and *St. sexangulare.* The Entomostraca were very numerous, and included various Copepods, *Bosmina longirostris,* and an abundance of Nauplii. Many of the dead individuals had been attacked by species of *Saprolegnia.* Only a few Rotifers were present, the two most conspicuous being *Anuræa cochlearis* and *Notholca longispina.*

A few specimens were observed of a solitary species of the genus *Dinobryon* which we have described as new under the name of *D. crenulatum.*

4. *Derwent Water, Cumberland.* June 1903. Altit. 238 feet. About three miles in length by a little over a mile in breadth. Average depth about 18 feet; maximum depth 72 feet. This lake receives the drainage of the Borrowdale mountains, and although the small town of Keswick is not far from its northern shore, there is probably little contamination from

that quarter. The June plankton is a DINOBRYON-PLANKTON, consisting for the most part of immense quantities of *Dinobryon cylindricum* var. *divergens*. *Peridinium Willei* was not uncommon. Desmids were very scarce, and few species were represented. Rotifers were few. Quantities of the pollen-grains of Pines were present in the plankton.

5. *Bassenthwaite Water, Cumberland.* May 1903. Altit. 223 feet. About four miles long by three-quarters of a mile wide. Average depth about 18 feet; maximum depth about 70 feet. This lake is in the extreme north-west of the English lake-area, and lies about two miles west from the summit of Skiddaw (3054 feet). There is doubtless a slight contamination of the water from farms and residences in the vicinity of the lake. Diatoms were the dominant feature of the plankton, the most conspicuous species being *Tabellaria flocculosa, T. fenestrata, Synedra pulchella,* and *Nitzschia palea*. Very few Desmids occurred, *Spondylosium pulchrum* var. *planum* being the most frequent. *Dinobryon cylindricum* var. *divergens* was scarce, as was also *Peridinium Willei*. There were few Rotifers.

6. *Thirlmere, Cumberland.* June 1903. Altit. 553 feet. About three and a quarter miles long by about half a mile broad. In 1894 this lake was first used as the water supply for the City of Manchester, and its level raised 20 feet. It has a maximum depth of about 128 feet, and there is scarcely any possibility of contamination of the water. The June plankton consisted mostly of Crustacea (with an abundance of Nauplii) and Rotifers. *Tabellaria flocculosa* and *T. fenestrata* were both common, and were both in the form of chains. The most interesting member of the phytoplankton was *Rhizosolenia morsa*, some individuals of which had formed resting-spores.

7. *Wast Water, Cumberland.* June 1903. Altit. 204 feet. About three miles long by about half a mile broad. It is the deepest of the English lakes, having an average depth of 135 feet, and a maximum depth of 258 feet. It contains a very large volume of water, which is practically free from all contamination, and rising from its south-eastern shore are the world-famous screes. It receives the drainage from the western side of Scafell (3162 feet) and Scafell Pike (3210 feet), and from the southern slopes of the Steeple, the Pillar, and Kirk Fell. The June plankton contained large numbers of Crustacea and Rotifers. Of the latter, *Polyarthra platyptera* and *Notholca longispina* were most conspicuous. The Desmids were few in

number, but included some particularly fine specimens of *Staurastrum jaculiferum*. *Cocconema gracile* and a few other Diatoms were observed. The most interesting member of the phytoplankton was *Elakatothrix gelatinosa* Wille, this plankton-alga not having been observed from any other lake in the British Islands.

We are receiving periodic collections from this lake, and the August and September collections, 1908, contained quantities of *Elakatothrix*.

8. *Brothers' Water, Westmorland.* September 1906. Altit. 520 feet. A small lake about three-quarters of a mile long by a quarter of a mile broad. Its greatest depth is about 70 feet. The dominating constituents of the September plankton were Desmids and the spiny Flagellate *Mallomonas longiseta*. In fact, the latter was so numerous that the plankton could be correctly termed a MALLOMONAS-PLANKTON. The principal Desmids were *Staurastrum Arctiscon* (very common), a large stout variety of *St. brevispinum*, *X. antilopæum* var. *triquetrum*, and *Cosmarium depressum*. *Ceratium hirundinella* was common, and a few specimens of *C. cornutum* were observed. Large colonies of *Dinobryon cylindricum* var. *divergens* occurred rather sparingly. Many Crustacea and Nauplii were present, and the three Rotifers *Anuræa cochlearis*, *Notholca longispina*, and *Polyarathra platyptera* were equally abundant. Fine specimens of *Acanthocystis chætophora* were frequent in the plankton.

9. *Hayes Water, Westmorland.* September 1906. Altit. 1383 feet. A small mountain lake with rocky shores, about a quarter of a mile long, lying under the western slopes of the High Street Range. It contained a mixed plankton of which *Gymnodinium paradoxum* was the most conspicuous constituent. *Oscillatoria tenuis* and *Tabellaria flocculosa* were both common. There were few Desmids, but *Ankistrodesmus Pfitzeri* was plentiful, mostly in process of formation of autospores. As would be expected, much dark-coloured organic matter was in suspension in the water.

10. *Red Tarn, Westmorland.* May 1903. Altit. 2356 feet. This is a small mountain lake, about a quarter of a mile square, on the eastern side of Helvellyn, and immediately below the summit (3118 feet). The surroundings are rocky, and there is no possible source of contamination. The plankton was mixed in character. *Dinobryon cylindricum* and *Tabellaria flocculosa* were equally common. Of the other Diatoms, *Synedra radians'*

and *Cocconema ventricosum* were the most noticeable. Large numbers of small Desmids were present, of which *Cosmarium abbreviatum* var. *planctonicum* was the most abundant, although *Staurastrum denticulatum* and bi- and tri-radiate forms of *St. jaculiferum* were exceedingly common. *Peridinium Willei* was frequent, and a few specimens of *Anuræa cochlearis* were observed.

11. *Ullswater, Westmorland.* May 1903 and September 1906. Altit. 476 feet. About 7½ miles long by three-quarters of a mile broad. Average depth 83 feet; maximum depth 205 feet. This is one of the larger lakes, mostly with rocky shores, and its upper end is situated among high mountains. The water is somewhat contaminated by the hamlets of Patterdale and Glenridding, and also by the water running from the Greenside Lead Mines. As a result of this slight contamination, the plankton is great in bulk, but poor in quality for the size and situation of the lake. It is an ASTERIONELLA-PLANKTON both in May and September. In May little else exists besides the enormous quantity of *Asterionella formosa*, only a few specimens of *Tabellaria flocculosa* and *Dinobryon cylindricum* var. *divergens* being observed. In September the great mass of *Asterionella* has amongst it a sprinkling of other Diatoms, a few Desmids, and a considerable quantity of *Dinobryon cylindricum* var. *divergens*. *Tabellaria flocculosa* occurs in long chains and *Tabellaria fenestrata* var. *asterionelloides* is frequent. The Desmids are chiefly *Spondylosium pulchrum* var. *planum*, *Staurastrum brevispinum* (large variety), and *St. cuspidatum* var. *maximum*. *Oocystis lacustris* and *Sphærocystis Schroeteri*, both of which are typical plankton-species of the Protococcoideæ, were not uncommon. *Anuræa cochlearis* was also present.

12. *Hawes Water, Westmorland.* September 1906. Altit. 694 feet. About two and a half miles long by about three-eighths of a mile broad. It is rather an isolated lake, with a maximum depth of 103 feet, and an average depth of about 40 feet. The September plankton was somewhat mixed, but was *mostly a Diatom-plankton, with a large admixture of Cælosphærium Kützingianum*. The Diatoms were chiefly zig-zag chains of *Tabellaria fenestrata*, *Cocconema gracile*, *C. cymbiforme*, and *Synedra Acus*. *Ceratium hirundinella* was common, and sterile filaments of *Mougeotia elegantula* were frequent. A few Desmids were observed, amongst which *Staurastrum jaculiferum* was the most abundant. Others were *St. denticulatum*, *Arthro-*

desmus crassus, *Spondylosium pulchrum* var. *planum*, and *Gonatozygon monotænium* var. *pilosellum*. *Anuræa cochlearis* was frequent.

13. *Grasmere, Westmorland.* June and September 1903. Altit. 208 feet. About a mile long by half a mile broad. It has a somewhat rocky margin, and its greatest depth is 180 feet. The water may be slightly contaminated by the village of Grasmere. The September plankton was largely a *combined Diatom* and *Dinobryon-plankton.* The Diatoms consisted almost exclusively of *Asterionella formosa* and *Tabellaria fenestrata* var. *asterionelloides.* The *Dinobryon* was *D. cylindricum* var. *divergens.* *Ceratium hirundinella* was fairly common, and *C. cornutum* and *Peridinium Willei* occurred in small quantity. A few Desmids were fairly general, among which *Xanthidium subhastiferum* var. *Murrayi* and *Staurastrum cuspidatum* var. *maximum* were the most conspicuous. The most noteworthy Desmids were *Cosmarium controversum* and *Micrasterias Mahabuleshwarensis* var. *Wallichii*, the former being known from North Wales and N.W. Scotland, and the latter only from the plankton of lakes in Sutherland and the Shetland Islands. A sterile species of *Mougeotia* was frequent, and the filaments exhibited a coiling comparable to that observed in several of the Scottish lakes.* (Fig. 1 C. and D.). Species of *Mougeotia* occur in a living condition in the plankton of very many of the British lakes, throughout the greater part of the year, and the coiling of the filaments undoubtedly shows the development of a limnetic character, due to adaptation of the plants to an existence in the plankton. The coiling of the filament very considerably increases its floating capacity.

Several of the Myxophyceæ were not uncommon, more particularly *Oscillatoria Agardhii*, *Anabæna Lemmermannii*, and *Microcystis stagnalis.* Two *Rhizopods* were observed—*Arcella vulgaris* and a long-spined species of *Acanthocystis*.

The June plankton consisted of a mixture of large quantities of *Dinobryon cylindricum* var. *divergens* and *Peridinium Willei.* Amongst these flagellated organisms were a number of Rotifers, more especially *Hydatina* and *Anuræa cochlearis.*

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* W. and G. S. West in 'Journ. Linn. Soc. Bot.', XXXV., 1903, p. 524; also in 'Trans. Roy. Soc. of Edin.', XLI., Part III., 1905, pp. 497 and 510.

(*To be continued*).

In Memoriam.

WILFRED H. HUDLESTON, F.R.S., F.G.S., etc.

(1828-1909).

(PLATE VIII.).

ANOTHER gap in the group of prominent Yorkshire Geologists occurred on Friday evening, January 29th, when Mr. W. H. Hudleston passed away, after a very brief illness. The day previous, though he was in his eight-first year, he was in his usual health, being remarkably active and energetic for his age.

Mr. Hudleston was born at York, and his early years were devoted to the study of ornithology. Between 1853 and 1860 he travelled extensively in Europe and northern Africa; and at the celebration of the jubilee of the British Ornithologists' Union, held in London a month before his death, he was one of four original members who received a gold medal.

In his boyhood days he was a play-fellow of the late Henry Clifton Sorby, whose death we only recently had to deplore. He was then known as Simpson, his father being Dr. Simpson, of Harrogate. He joined the Geological Society of London in 1867 in the name of Simpson, but a fortnight later changed his name to that more familiar to us.

In the 'seventies he devoted much time to the study of the Yorkshire Secondary Rocks, and his well-known monographs on the Palæontology of Yorkshire Oolites, which appeared in the 'Geological Magazine,' and in the Reports of the Palæontographical Society, are amongst the earliest and best known of his published papers. These at once stamped his reputation as a careful student of fossil forms, and though written so long ago, they are in constant use by workers in these fields to-day.

In the 'seventies also he was for three years the secretary of the London Geologists' Association, and became its President in 1881. From 1886-1890 he was one of the Secretaries of the Geological Society, and was its President for the years 1892-4. The Wollaston Medal, the highest award of the Geological Society, was bestowed upon him in 1897, and in the following year he was President of Section 'C' of the British Association, at the Bristol Meeting.

Yorkshire geologists particularly regret the departure of a most amiable and able leader of excursions, and on the many occasions upon which he conducted parties around the quarries in the Scarborough district, his value was realized.

In 1888 Mr. Hudleston was the President of the Yorkshire Naturalists' Union, and conducted an excursion to Robin Hood's Bay. At the annual meeting held at Sheffield, he gave his presidential address 'On the Geological History of Iron Ores,' which, oddly enough, was printed in the 'Proceedings of the Geologists' Association' for May 1889.

Mr. Hudleston was the subject of one of the well-known 'Eminent Living Geologists' series, which appeared in the 'Geological Magazine' for 1904. This is accompanied by an excellent portrait and list of his papers up to that date.

On Plate VIII, is a reproduction of the portrait, which appears to be the only one of Hudleston extant.

T. S.

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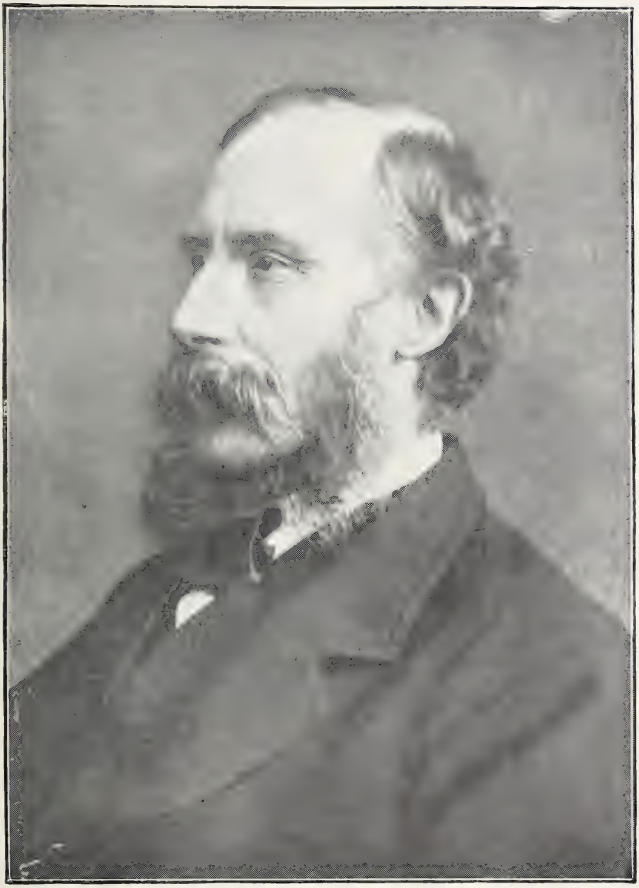
Vol. II. of **The Book of Nature Study,** edited by Prof. J. B. Farmer (London, Caxton Publishing Co., price 7/6 net), is to hand. It is quite equal to its predecessor, already noticed in these columns. It is well illustrated by reproductions from photographs, diagrams, etc., in the text, and coloured plates. Mr. O. H. Latter has several chapters on Insects, Spiders, Worms, etc.; Dr. Marion J. Newbigin describes the animals and plants of fresh-water and marine aquaria; and Prof. J. Arthur Thompson describes the chief haunts of animals, in a very instructive and entertaining manner. The volume is tastefully bound in green cloth.

Bird-Hunting through Wild Europe, by **R. B. Lodge.** London: Robert Culley. 333 pp., 7/6 net.

The author of this book has been fortunate in visiting several of the most inaccessible parts of Europe, in search of birds and eggs and photographs, all of which he has 'taken,' and his exploits are unblushingly detailed in this volume. And they are very entertaining, though not many writers now-a-days so openly refer to their many achievements amongst rare birds and eggs. Probably, however, Mr. Lodge contributes to various funds for the protection of rare birds and their eggs! Some of his help-mates on his expeditions he forbears to name, at their own request, which we can quite understand. Judging from the 'List of Species met with,' the author has had 'bags' such as many might envy, and his book contains particulars of the travels and hardships and trials in securing these. As with most authors of his kind, there is just a little bit too much of the difficulties he has experienced, which renders a perusal of the book rather irritating at times. That he is an exceptionally well-equipped person for the purpose is apparent from his own concluding paragraph:—'Thus ended our expedition full of interest, in spite of some occasional hardship and discomfort and constant and continual hard work. For bird and egg collecting, combined with photography, in wild countries, is no child's play, and requires absolute fitness in condition and general health, and plenty of enthusiasm for the work, without which it is impossible to stand the strain and bodily and mental fatigue.' The book is illustrated by a large number of fine photographs of birds, nests and eggs, scenery, and occasionally samples of the female population, with which latter we cannot congratulate him on the choice of his subjects, though possibly it was policy to select these for reproduction! In speaking of the nest of the Bittern, we notice he suggests that a photograph has not yet been taken. We would point out, however, that such a photograph, by a well-known Hull ornithologist, was published in a contemporary some little time ago.



Very truly yours
W. H. Hudleston

BRITISH M
NATURAL HISTO

YORKSHIRE NATURALISTS' UNION MEETINGS.

A largely-attended meeting of the VERTEBRATE SECTION of the Yorkshire Naturalists' Union was held in the Leeds Institute, on Saturday, February 13th. When it is considered that the meetings (with a short one of the Wild Birds' Protection Committee) lasted from 2 p.m. to 9-30 p.m., it will be understood that it was necessary to be interesting in order to keep the audience for so long a time.

The President of the Union, Mr. St. Quintin, occupied the chair during the afternoon meeting, and Mr. R. Fortune, President of the Vertebrate Section, for the remainder of the time.

For the Wild Birds' Protection Committee, it was reported that watchers had been arranged for at Spurn and Hornsea Mere, and several interesting letters were read from last season's watchers, etc.

Dr. E. S. Steward, of Harrogate, read an extremely interesting paper upon his experiences during a bird-nesting expedition into south Spain, making many of his hearers long to have the same opportunities of studying numbers of our rarer British birds, where they are found nesting in abundance.

Mr. E. E. Gregory followed with a paper upon 'The Pleistocene Vertebrate Remains of the West Riding.' This, too, was full of interest, especially to the members of the new Mammalia, etc., Committee, affording a splendid guide to their future investigations in this direction. It was illustrated by specimens found in several Yorkshire caves. After an interval for tea, Prof. Patten gave a short account of 'Four hours' continuous observations of the feeding habits of Richardson's Skua.' The observations were made in Dublin Bay, and the account of how the Skua procures his food, by preying upon the gulls and terns, was made especially interesting through being illustrated by lantern slides from Prof. Paten's sketches, made on the spot.

Mr. Whitaker's notes on 'British Bats' were profusely illustrated by lantern slides. Members were particularly pleased to hear Mr. Whitaker, who is our recognised Yorkshire authority upon these mammals. The lecture was enlivened by some very amusing anecdotes.

Mr. Oxley Grabham then gave a short and very racy lecturette upon some of the birds of the Yorkshire Coast, etc., illustrated by a fine series of lantern slides. The account of Spurn and its bird life, beautifully illustrated as it was, gave a splendid idea of the locality, and of the work done there by the Yorkshire Naturalists' Union Birds' Protection Committee. Mr. Grabham showed some charming slides of White Hedgehogs, which he obtained from the neighbourhood of Pickering, stating that there appears to be a strain of albinos in the district.

Messrs. Jasper Atkinson and Wm. Hewett showed a fine series of slides, chiefly bird studies, but as the time was getting late, they were put through the lantern, accompanied by very few remarks.

Several other lots of slides were not exhibited, owing to want of time.

At the beginning of the meeting, Mr. W. Wilson exhibited a White Carrion Crow, particulars of which will duly appear in 'The Naturalist.' The bird presented a very weather-worn appearance, the long tail and flight feathers being much worn and frayed.

Votes of thanks to the Chairman, and to all contributing lectures and slides, brought a most interesting meeting to a close

On the same date, the YORKSHIRE MARINE BIOLOGY COMMITTEE, in conjunction with the Leeds Conchological Club, had a meeting. Prof. Walter Garstang, M.A., D.Sc., of the Leeds University, as Chairman of the Section, gave an interesting address. After referring to the able work of his predecessor, the late Dr. H. C. Sorby he described the methods of work of such a Committee by which he thought good results might be achieved. He also dwelt upon the importance of recording every observation, no matter how unimportant or minute it may appear. He gave instances where valuable observations, made by ardent field naturalists of the working-man type, were lost to science, through not being recorded. He thought by careful attention to every little detail in recording matter or observation, much might be added and saved for reference in the future.

Preceding Dr. Garstang, Mr. J. W. Taylor addressed the members of the Leeds Conchological Club on the physiology, morphology and distribution of *Hygromia fusca* and *H. granulata.* Further suggestons and remarks from Mr. Arnold T. Watson, F.L.S., of Sheffield, Rev. F. H. Woods, B.D., Driffield, Mr. S. Lister Petty, Ulverstone, Mr. T. Sheppard, F.G.S., Hull, and Mr. W. Denison Roebuck, F.L.S., Leeds, with a vote of thanks to the two lecturers, brought a very profitable and enjoyable meeting to an end.—F. B.

REVIEWS AND BOOK NOTICES.

Lincolnshire Naturalists' Union Transactions, 1907.*

It is said that all things come to those who wait. The members of the Lincolnshire Naturalists' Union have waited patiently for the Transactions, 1907, and have, at last, received them. One feels afraid to write what one thinks about the present part. As in the previous issues, a very mportant feature is the excellent lists of County Flora and Fauna. Miss S C. Stow contributes a list of 'Lincolnshire Galled-plants'; Mr. G. W. Mason a list of Lincolnshire Moths (Spinges and Bombyces) under the title 'The Lepidoptera of Lincolnshire, Part 1.' It is somewhat difficult to understand this title when we remember that in the Transactions for 1906, Mr. Mason contributed a list of 'Lincolnshire Butterflies.' Have butterflies ceased to be considered Lepidoptera in Lincolnshire, or is it intended to publish a new list as a subsequent part? Some of the records in Mr. Mason's list are of great interest, particularly the Oleander Hawk Moth, taken at South Somercoates, and the Reed Tussock Moth, taken by Mr. F. Arnold Lees, near Market Rasen in 1878. The Rev. Thornley and Dr. W. Wallace contribute a remarkably good list of 'Lincolnshire Coleoptera' (Geodephaga), and there are other papers (including the President's address on 'The Pygmy Flint Age in Lincs.') and notes.

It is a very great pity that such valuable contributions as some of them are, should not have been published with much greater care. To be as mild as possible I do not hesitate to say that this issue of the Transactions is not creditable to anyone; errors and misprints are by no means uncommon, in fact, the latter are very abundant; no rule seems to have been recognised in the use of italics, and capital letters are used where small letters should be, and small letters where capitals should be. In one paragraph of 13½ lines on page 208, some eighteen corrections are required; page 207 is not much better. I certainly did not know before that a Rhynchonella was a Lamellibranch, which is the only inference to be drawn from the sentence—'Rhynchonella and other Lamellibranchs are abundant.' On page 209 is a plant name certainly new to me, and, I believe, new to science, to wit—'Alchemillavl ugaris'; several other misprints appear on this page. On page 212 '*Cochlevaria*' stands for *Cochlearia*, and '*Lyeopus*' for *Lycopus*, and on the next page *Lychnis flos-cuculi* set out as '*Lychnis Floscuculi*'; but what is most conspicuous on this page is the use of more than one and the same fount of type for the grand array of initials. By the way, is not the adopted system of recording very superficial? I believe that frequently the recorder sits in the brake with surface-soil map on the knee, and notes down the various plants growing on the roadside, the conveyance often travelling seven miles an hour.

The pointing in many cases is very unsatisfactory, and makes some of the passages look sheer nonsense. Three examples may be given (two over pointed, and the other without points):—

---

* Louth, pp. 219-271.

'A series of variegated clays, with layers of sand, shale, and limestone, partly marine and partly fluviatile ; the former, with ostreas, at the top, and the latter at the base with paludinas and other fresh-water shells.'

'The Cornbrash, a coarse rubbly limestone, with sandy layers, which was deposited in a shallow sea.'

'Mr. T. S. Bavin has presented a series of specimens from a bore made to locate coal in which the Keuper is found to be at the West of the County 850 feet in thickness.'

In a professedly scientific publication, it is somewhat surprising to find the following passage (which must surely have been misplaced, being intended for one of those famed penny twaddlers)—'Well may we sing with Robert Louis Stevenson in his *Garland of Verse*—

"The world is so full of a number of things
I am sure we should all be as happy as kings."

We had a right royal welcome at Grantham. The day however [!] was much enjoyed.'

The object of the Union is presumably expressed, though badly, in the following sentence appearing in the report of the 'Field Meetings' :—'The meetings are of such value as to obtain a great amount of information for the County lists for publication.'

In the copy before us, the plate illustrating 'the junction of the Foss Dyke and the Trent at Torksey' is duplicated, one plate facing page 163, the other facing page 167. Attempts have been made, unsuccessfully, to staple this copy in three places, the result being that when opened, it fell to pieces.

Though dated 1907, there is nothing to show that the present part appeared in the middle of 1908, though a date on the balance-sheet indicates that, at any rate, it was published in the latter year. The address of John Cordeaux which is reprinted, unnecessarily we think, from the Union's Transactions for 1895, has nothing to shew that its author has been dead for some years.

The above do not exhaust the list of errors, misprints, and other faults, but they are sufficient to shew the necessity of someone taking a few lessons in proof-reading, etc., before the next issue of Transactions, and thereby ensure valuable scientific work being more creditably published.

LINDUM.

Part VII. of T. C. and E. C. Jack's **'Wild Beasts of the World'** (1/- net), deals with the Bears, Sea-Lions, Walrus, Seals, Hedgehogs, Voles, etc., and is illustrated with the usual finely-coloured plates. Speaking of Walrus tusks, we notice the author (Mr. F. Finn), states that they are largely used for making artificial teeth. That was certainly the case when the natural history books of years ago were written, but artificial teeth of this material are difficult to get now-a-days. We have been trying to get such a set for a long time, but so far without success !

The Vertebrate Section of the Yorkshire Naturalists' Union has reprinted its Report for 1908, in advance. It contains excellent summaries of work carried on in the three Ridings, written by Messrs. R. Fortune, E. W. Wade, and T. H. Nelson, as well as particulars of the work of the Wild Birds' and Eggs' Protection Committee.

The Writers' and Artists' Year Book, 1909 (A. and C. Black, 1/-), is indispensable to those who add to their income by writing. It gives a classified list of the various publications, their rates of payment for MSS., etc. There is a complete list of such journals ; lists of publishers, agents, etc. Some useful advice is given as to the preparation of MSS. ; correcton of proofs, etc. We notice that 'The Naturalist' does not appear under 'Science and Natural History' in the Classified Index on page 117, though it appears in its place amongst 'Journals and Magazines,' on page 42.

NORTHERN NEWS.

According to the ‘ Pall Mall Gazette ’ a roach of 3 lb. has been caught in the Dove and Dearne Canal, at Elsecar, Yorks.

We have heard of about ‘ making a noise like a turnip,’ but a contemporary, in the heading to a paragraph, records that a ‘ Privet hedge barked ! ’

An excellent portrait of a past President of the Yorkshire Naturalists’ Union, Sir Ralph Payne Gallwey, Bart., appears in ‘ The Shooting Times ’ for January 16th, 1909.

It is not often the ‘ Yorkshire Weekly Post ’ is hoaxed, but the following extracts from a report of a meeting of a Junior Field Naturalists’ Club are interesting :—‘ Mr. W. J. W. Slowe, B.E.N.A., gave a lucid description of the finding of *Balaena mysticetus* in the Hornsea Mere, a specimen of which he passed round for examination. Mr. H. Donaldson reported an excursion to Broomfleet, and exhibited a fossil sponge which he had procured from the Laurentian deposit there. Mr. A. J. Moore, M.C.S., read an interesting paper on “ Some Local Freshwater Mollusca.” The best collecting ground in the Hull district is Sutton Drain. In this drain *Ostrea edulis*, *Aguila chrysaetus*, can be procured, also the interesting species, *mephitis mephitica.*’

The Leeds Naturalists’ Club and Scientific Association celebrated the Darwin Centenary at its meeting on the 15th February. Mr. Harold Wager, F.R.S., gave an address on ‘ Charles Darwin.’ Mr. Wager exhibited the Darwin-Wallace medal, while the President of the Club, Mr. W. Denison Roebuck, F.L.S., exhibited a lithograph facsimile of the illuminated address which the Yorkshire Naturalists presented (by deputation visiting Down) to Mr. Darwin in 1880, in celebration of the ‘ Coming of Age ’ of the ‘ Origin of Species,’ also the original letter from Mr. Darwin, acknowledging the compliment. Afterwards a resolution was adopted, congratulating Dr. Alfred Russel Wallace on his living to see the fiftieth anniversary of the reading of his and Mr. Darwin’s papers to the Linnean Society.

The following will be the presidents at the meeting of the British Association at Winnipeg from August 25th to September 1st :—*President*—Professor Sir J. J. Thomson, F.R.S. ; *Sectional Presidents*—A (Mathematical and Physical Science)—Professor E. Rutherford, F.R.S. ; B (Chemistry).—Professor H. E. Armstrong, F.R.S. ; C (Geology)—Dr. A. Smith Woodward, F.R.S. ; D (Zoology)—Dr. A. E. Shipley, F.R.S. ; E (Geography)—Colonel Sir Duncan A. Johnston, K.C.M.G. ; F (Economic Science and Statistics)—Professor S. J. Chapman ; G (Engineering)—Sir William H. White, K.C.B., F.R.S. ; H (Anthropology)—Professor J. L. Myres ; I (Physiology)—Professor E. H. Starling, F.R.S. ; K (Botany)—Lieu.-Colonel D. Prain, F.R.S. ; L (Educational Science)—Rev. Dr. H. B. Gray ; and Sub-Section (Agriculture)—Major P. G. Craigie (chairman).

Mr. Hans Schlesch, who has frequently favoured the Hull Museum with mollusca, has now presented to that institution the whole of his extensive collection of Land, Fresh-water, and Marine Shells. This collection is well known for its completeness, and for the many type specimens it contains. Mr. Schlesch has been a most enthusiastic collector, having visited many different countries to obtain specimens, and on giving up his hobby he has decided to favour the Hull Museum with the result of his life's work. The collection contains specimens from France, Germany, Russia, Denmark, and other parts of Europe ; China, Japan, India, the Philippines, New Guinea, Australia, the United States, etc. Large cases containing many thousand specimens have already been received, and the remainder is on the way. He has also presented his library of works bearing upon the specimens in the collection.

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LIST OF YORKSHIRE COLEOPTERA. By REV. W. C. HEY, M.A.

THE NATURALIST. A Monthly Illustrated Journal of Natural History for the North of England. Edite by T. SHEPPARD, F.G.S., Museum, Hull; and T. W. WOODHEAD, F.L.S., Technical Colleg Huddersfield; with the assistance as referees in Special Departments of J. GILBERT BAKER, F.R.S F.L.S., PROF. PERCY F. KENDALL, M.Sc., F.G.S., T. H. NELSON, M.B.O.U., GEO. T. PORRIT F.L.S., F.E.S., JOHN W. TAYLOR, and WILLIAM WEST, F.L.S. (Annual Subscription, payab in advance, **6/6** post free).

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NOTES AND COMMENTS.

IMPORTANT WORK ON DIATOMS.*

The completion of this great work, which has been appearing in parts throughout the past eleven years, will be hailed with pleasure by all students of the Diatomaceæ. Though expressly intended to deal with those forms that are found on all the coasts of France, it will be found to contain most, if not all of the species of the North Sea and English Channel, and is hence equally valuable to English students. The plates are certainly among the finest drawings of these beautiful microscopic Algæ that have ever been published. Specially worthy of notice are the discoid forms of *Actinocyclus*, *Coscinodiscus* and *Eupodiscus*, and the wealth of detail in such species as the *Naviculas* of the *Diploneis* section.

EVOLUTION OF DIATOMS.

M. Peragallo's views on the evolution of the Diatoms are set forth in a sort of postscript to the preface accompanying the issue of the final part, and are in some respects both novel and interesting. He holds that the earliest forms of diatoms were of the kind he denominates 'Centriques' (corresponding to Van Heurck's 'Crypto-Raphideæ'), and comprising all forms of circular or angular outline, and those having spines or other processes, and that these descend directly from animal forms, either from the Radiolariæ, or in part from the Peridineæ.

PLANKTON.

The 'Centriques' are those species that we find to-day floating on the ocean in what is known as the 'Plankton' and are distinguished from the 'Pennées' (Peragallo's other division) not only by their form arranged at about equal distances around a centre, and by the absence of a raphe, but also by their reproductive method, which is by the generation of spores, whereas the 'Pennées' reproduce their kind by conjugation. The author describes how the free-floating, but individually motionless 'Centriques' developed in the 'Pennées' to a naviculoid or boat-shaped form with a raphe or longitudinal slit which is now generally acknowledged to be in some way the organ of the mysterious power of motion of diatoms. This division constitutes Van Heurck's 'Raphideæ.'

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* 'Diatomées Marines de France,' by M.M. H. et M. Peragallo. J. Tempére, Grez-zur-Loing (S-et-M) France. 560 pp., 139 plates, 2187 fig., 150 francs.

DEGRADED DIATOMS.

Finally he looks on the 'Pseudo-Raphideæ' as a sort of degraded forms that have adopted a mode of life limited by their growing attached to Algæ, and consequently have lost their raphe by disuse, and with it their power of movement, the median blank space indicating the position formerly occupied by the raphe. Of course this theory involves the transference of the *Nitzschias* (whose motions are among the liveliest) along with the *Surirellas* and *Epithemias* from the Pseudo-Raphideæ to the Raphideæ. There is very much to be said for this view. It is certain that the most ancient fossil deposits such as Richmond, Virginia, and Oamaru, New Zealand, consist almost entirely of the discoid forms, while in our modern seas and rivers, the Naviculoid forms constitute the great majority.

ORIGIN OF DIATOMS.

It is questionable whether M. Peragallo will find many who agree with him as to the animal origin of diatoms, while admitting that now they belong to the vegetable kingdom; but this is a difficulty which may probably disappear with further knowledge of these lowly forms of life, which may be said to belong in one sense or another to either kingdom. We regret to be unable to extend the great praise due to the artist for the plates to the printer or proof-reader. The list of corrigenda is a long one, and does not comprise all that there should be.

R. H. P.

THE DONCASTER MUSEUM.

At the request of the Doncaster Corporation, the Curator of the Hull Museums recently prepared a 'Report on the Proposed Museum at Doncaster,' which has been printed and discussed by the Doncaster Town Council. In it Mr. Sheppard draws attention to the smallness of the space available in the few rooms at Beechfield, which it was proposed to set apart for museum purposes, and urged that the whole of the ground floor should be available. Suggestions were also made as to the scope of the proposed Museum, dealing principally with the desirability of keeping it *local* in character. It is pleasing to find that practically the whole of the recommendations have been adopted by the Doncaster Corporation, and consequently that town will shortly have its permanent public Museum.

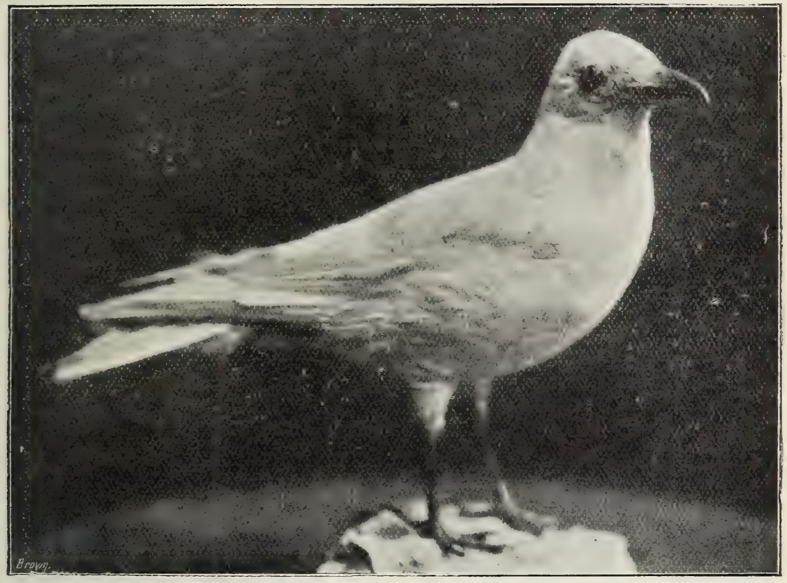
ALBINO CARRION CROW IN YORKSHIRE.

WALTER WILSON.

THIS was reported in 'The Naturalist' for October 1906, and May 1907, and in 'Birds of Yorkshire,' Vol. I., page 242.

The last report recorded in 'The Naturalist' was from Barden, April 3rd, 1907, since then it appears to have frequented the Hetton Moors, between Rylstone and Malham, during the summer of 1907, where I saw it in company with another crow, probably its mate.

In August of that year it was shot at several times by grouse shooters on the moors, but always escaped, a fate which did not favour its mate, which was shot towards the end of that month.



Albino Carrion Crow.

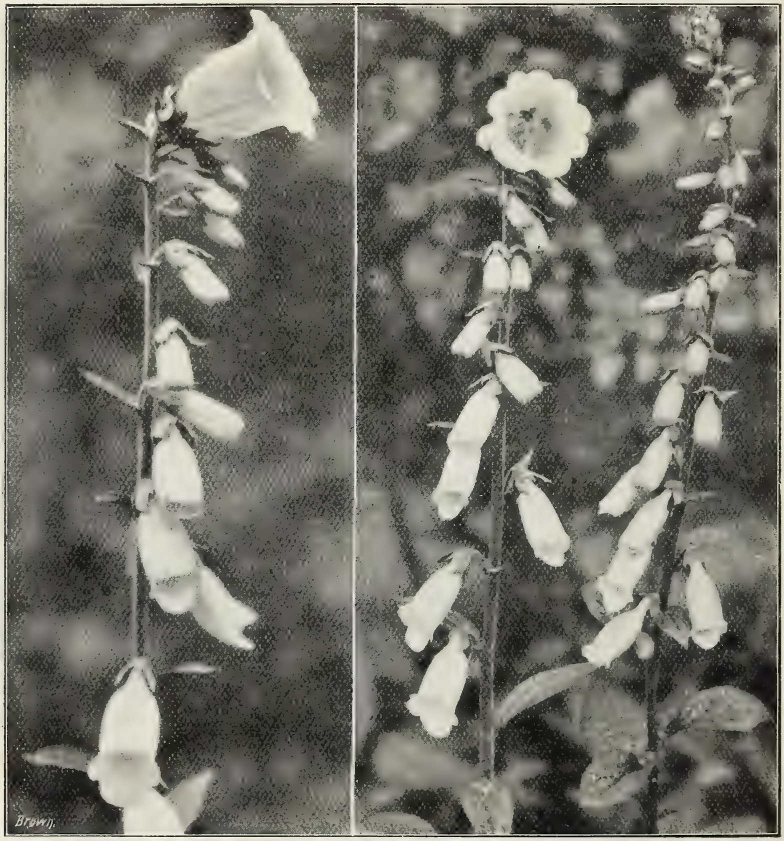
During the winter of 1907-8 it appears to have retired to the Fountain Fell district, along with a number of other crows.

This last summer (1908), it again made its appearance in the Winterburn district, but this time it was not as bold, and escaped from many attempts to secure it, until finally it was shot in May, near Eshton Tarn, by a keeper of Sir M. Wilson, Bart, who had been baiting for it with dead rabbits for some weeks. Sir M. W. Wilson of Eshton Hall, has had the bird set up for his private collection. The measurements are: length, 17½ inches; bill, 2¼ inches; wing (expanse), 12½ inches; tarsus, 2½ inches.

PELORIA IN PLANTS.

E. SNELGROVE, B.A.

THE accompanying figures (from photographs), show a Foxglove grown in a Sheffield garden during the past summer. The resemblance of the top flower to a Campanula is very striking, so much so that people who saw it growing, described it as such.



Peloria in Foxglove.

Two facts are plainly brought out in the photographs :—(1) that the top flower, unlike the others, is regular ; (2) that it is opening as early as the lowest flowers of the raceme.

The occurrence of this kind of thing, viz., a regular flower produced on a plant that normally bears irregular flowers, is known as *peloria*. The name explains nothing, for it only means a monstrosity or sport. Perhaps that is all that can be said with certainty. Darwin notes that those flowers nearest the axis are most subject to peloria, and thinks such occurrence 'may be connected with a different flow of nutriment towards the central and external flowers.' He seems to have in mind chiefly the disk flowers of a composite like the Daisy. In such a case the growth of irregular ray flowers seems to be precisely the opposite to what has occurred in our present example.

In the 'Transactions of the Woolhope Naturalists' Club,' 1902, p. 49, there is a note (with plates), on a similar instance of peloria, but it occurred on every branch of the plant, the number of carolla lobes was in each case doubled, and the number of stamens was also double, distinctly leading to the suggestion made that two flowers had become one.

Examples are often met with (in fact in some years are quite common) of Daisies, Buttercups, Wallflowers and Dame's Violet producing broad, flat, flowering axes, on which flowers are crowded, and often run into one another.

The Toadflax, again, is said (I have not seen it) to produce sometimes a five-spurred flower.

Two conclusions are fairly clear:—

(1) The examples of peloria in Compositæ and Umbelliferae, as quoted by Darwin, are quite different from all the other examples here adduced, unless (as certainly does not appear to be the case), he suggests that flowers like those of the Dandelion, are normal, and the disk flowers of the Daisy 'abnormally symmetrical.''

What is the meaning of the statement that 'flowers nearest the axis are most subject to peloria?' The ray flowers of a composite are not nearest the axis.

(2) The obvious explanation of the malformations of Buttercups etc., known as *fasciation,* is that two (or more) flowers have grown together.

This explanation may stand for the Foxglove *peloria,* but what of the five-spurred Toadflax? It might be suggested that the case of the former was one of reversion to regular form, but the number of corolla lobes is against such a conclusion.

Perhaps all we can say is—

(*a*) Buttercups, etc., exhibit fasciation.

(*b*) Toadflax correlated variation, and the Foxglove something of both.

1909 April 1.

THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,
AND
G. S. WEST, M.A., D.Sc., F.L.S.

(*Continued from page 122*).

14. *Codale Tarn, Westmorland.* June 1903. Altit. 1528 feet. A small mountain tarn receiving the drainage from parts of Tarn Crag (1801 feet) and High White Stones (2374 feet). The plankton contained various filamentous Chlorophyceæ, such as *Microspora abbreviata* and species of *Mougeotia.* Washed in from the shores of the tarn were filaments of *Binucleara tatrana,* fragments of *Stigonema minutum,* and a few filaments of *Hammatoidea Normanii.* Numerous Desmids were present, among which should be mentioned *Cosmarium ornatum, C. bioculatum Arthrodesmus Incus, Staurastrum anatinum,* and *Gymnozyga moniliformis.* The most abundant Diatom was *Tabellaria flocculosa,* and long ribbons of *Eunotia pectinalis* were frequent. *Peridinium Willei* was again much in evidence.

15. *Easedale Tarn, Westmorland.* May 1903. Altit. 915 feet. A small lake, about a third of a mile in length, with rocky shores. The dominant features of the plankton were numerous

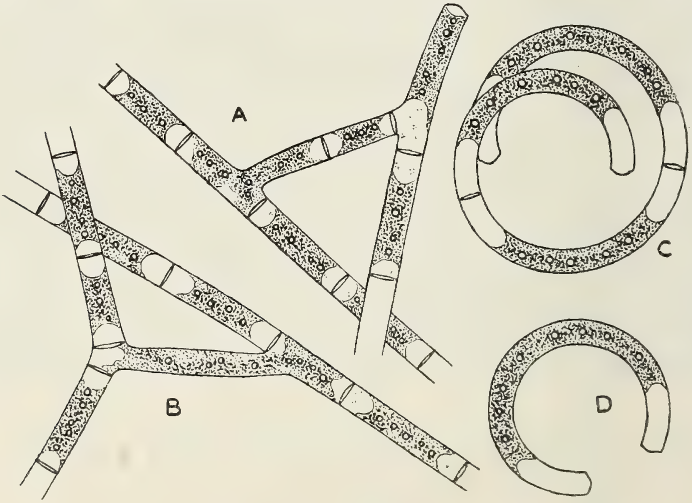


FIG. I. A. and B.—Filaments of *Mougeotia* sp. from the plankton of Easedale Tarn (×200), showing a curious anastomosis which may be due to aborted conjugation. C. and D., Coiled filaments of *Mougeotia* sp., from the plankton of Grasmere (×200). D. consists of one cell only.

Desmids, and a large quantity of *Peridinium Willei.* The Desmids included *Penium truncatum, Micrasterias radiata, Arthrodesmus triangularis* var. *subtriangularis, Hyalotheca mucosa, H. neglecta, Staurastrum Arctiscon, St. gracile* var. *nanum, St. anatinum* var. *Lagerheimii, St. Ophiura,* and *St. Brasiliense* var. *Lundellii.* The two latter have not previously been found in England. The principal Diatoms were *Tabellaria flocculosa, Eunotia pectinalis,* and *Vanheurckia rhomboide* var. *saxonica.* A sterile species of *Mougeotia* was common, and a curious anastomosis of two filaments was observed. The connections between the filaments may have been the result of aborted conjugation, and were cut off either completely or partially from the cells of the filaments (Fig, 1 A. and B.).

The Rotifers *Polyarthra platyptera, Anuræa cochlearis,* and others, were frequent, and a number of specimens of *Nebela flabellulum* were observed.

Fragments of *Binucleara tatrana* were fairly common in the plankton.

16. *Stickle Tarn, Westmorlaud.* May 1903. Altit. 1540 feet. This is a mountain tarn about a quarter of a mile in length and breadth, lying just under and to the eastward of Langdale Pikes (2401 feet). The dominant feature of the plankton was *Peridinium Willei.* Very few Desmids occurred, although *Staurastrum pseudopelagicum* deserves special mention, as it was observed only from this lake, and from Windermere. Diatoms (even *Tabellarias*) were few, and *Dinobryon cylindricum* var. *divergens* existed in small quantity. Entomostraca were in fair abundance, and much dark-brown organic matter was present. *Binucleara tatrana* was again observed in the plankton.

17. *Windermere.* Altit. 130 feet. This is the largest of the English lakes, having a length of about 10½ miles, and a maximum breadth of about a mile. Average depth 78 feet ; maximum depth 219 feet. The lake is on the boundary between Westmorland and the northern extremity of Lancashire. Its margins are largely rocky, with a good deal of woodland, but the hills immediately around it are not very high. Its waters are no doubt contaminated by the proximity of the villages of Bowness and Ambleside. Material was collected from this lake in June and September 1903, and periodical monthly collections were made from September 1907 to August 1908. These are considered in detail in a special part of this paper.

TABLE OF PHYTOPLANKTON.

The species are recorded in their respective columns by means of a " ×." No attempt has been made to indicate their relative frequency, as such a record would not be strictly comparative, the collections not all having been made at the same season of the year.

In the larger genera, the species are arranged in alphabetical order.

SPECIES.	Cumberland.							Westmorland.									
	Buttermere.	Crummock Water.	Ennerdale Water.	Derwentwater.	Bassenthwaite Water.	Thirlmere.	Wastwater.	Brothers' Water.	Hayes Water.	Red Tarn.	Ullswater.	Hawes Water.	Grasmere.	Codale Tarn.	Easedale Tarn.	Stickle Tarn.	Windermere.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CHLOROPHYCEÆ.																	
Œdogonium spp. (sterile)	×	×	..	..	..	..	×	×	..	..	..	..	..	×	×	×	×
Ulothrix subtilis Kütz. var. *variabilis* (Kütz.) Kirchn.	×	..	..	×	..	..	..	..	..	..	..	..	..	×	×		
,, *zonata* (Web. & Mohr) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Microspora amœna (Kütz.) Rabenh.	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	×	
,, *abbreviata* (Rabenh.) Lagerh.	..	..	..	..	..	..	..	..	..	..	..	..	..	×	×	×	×
Mougeotia elegantula Wittr.	..	..	..	..	..	..	..	..	..	..	..	×					
,, spp. (sterile)	×	×	..	..	×	..	×	..	..	×	..	..	×	×	×		
Zygnema sp. (sterile)	×	×	×	..	..	..	..	×	..	..	×	..	×				
Spirogyra spp. (sterile)	..	..	×	×	..	..	..	×	..	..	..	..	×	×	..	..	×
Gonatozygon monotænium De Bary	..	..	×	..	..	..	..	×	..	..	..	..	×				
,, ,, var. *pilosellum* Nordst.	..	..	..	..	..	..	..	..	..	..	..	×					
Cylindrocystis diplospora Lund. var. *major* West	..	..	×														
Penium truncatum Bréb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×		
minutum (Ralfs) Cleve	..	..	..	..	..	..	..	..	..	..	..	..	..	×			

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Netrium Digitus (Ehrenb.) Itzigs. & Rothe														×	×		
Closterium acutum Bréb.														×			
,, *Kützingii* Bréb.						×								×	×		
,, *parvulum* Näg.						×									×		
,, *setaceum* Ehrenb.			×												×		
,, *tumidum* Johns.			×														
Pleurotænium Ehrenbergii (Ralfs) De Bary							×								×		
Tetmemorus granulatus (Bréb.) Ralfs													×		×		
Euastrum ansatum Ralfs														×			
,, *bidentatum* Näg.															×		
,, *elegans* (Bréb.) Kütz.														×	×		
,, *montanum* W. & G. S. West															×		
,, *pectinatum* Bréb.			×					×					×				
,, *verrucosum* Ehrenb. var. *reductum* Nordst.			×					×					×	×	×		
Micrasterias denticulata Bréb.														×			
,, *Mahabuleshwarensis* Hobson var. *Wallichii* (Grun.) W. & G. S. West													×				
,, *papillifera* Bréb.			×											×	×		
,, *pinnatifida* (Kütz.) Ralfs			×														
,, *Sol* (Ehrenb.) Kütz. [=*M. radiosa* Ralfs]			×					×					×				
,, *radiata* Hass. [=*M. furcata* Ralfs]															×		
,, *truncata* (Corda) Bréb.			×														
Cosmarium abbreviatum Racib. var. *planctonicum* W. & G. S. West	×	×	×	×						×							
,, *bioculatum* Bréb.			×									×		×	×		
,, *Blyttii* Wille														×			
,, *Botrytis* (Bory) Menegh.						×		×					×				×
,, *capitulum* Roy & Biss. var. *grœnlandicum* Börges.			×														
,, *connatum* Bréb.			×														
,, *contractum* Kirchn. var. *ellipsoideum* (Elfv.) W. & G. S. West													×		×		
,, *controversum* West													×				
,, *costatum* Nordst.			×														
,, *depressum* (Näg.) Lund.		×						×							×		

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cosmarium depressum var. *achondrum* (Boldt.) W. & G. S. West							×										
,, *difficile* Lütkem. var. *sublæve* Lütkem.																	×
,, *formosulum* Hoff.						×											
,, *Logiense* Bissett															×		
,, *margaritiferum* Menegh.													×	×			
,, *ornatum* Ralfs														×			
,, *punctulatum* Bréb.														×			
,, *quadratum* Ralfs forma *Willei* (Schmidle) W. & G. S. West														×			
,, *reniforme* (Ralfs.) Arch.			×								×						
,, *subarctoum* (Lagerh.) Racib.			×		×												
,, *subcrenatum* Hantzsch														×			
,, *subtumidum* Nordst. var. *Klebsii* (Gutw.) W. & G. S. West		×		×								×	×				×
,, *Turpinii* Bréb.																	×
Xanthidium antilopæum (Bréb.) Kütz.	×		×					×	×			×	×		×	×	
,, ,, var. *depauperatum* W. & G. S. West	×	×	×							×			×		×		
,, ,, var. *triquetrum* Lund.								×					×		×		
,, *armatum* (Bréb.) Rabenh.														×	×		
,, *cristatum* Bréb. var. *uncinatum* Bréb.				×													
,, *subhastiferum* West var. *Murrayi* W. & G. S. West												×	×				×
Arthrodesmus convergens Ehrenb.										×							
,, *crassus* W. & G. S. West			×									×					
,, *incus* (Bréb.) Hass.	×		×		×									×	×		
,, ,, var. *Ralfsii* W. & G. S. West														×	×		
,, *triangularis* Lagerh.		×	×										×				
,, ,, var. *subtriangularis* (Borge) W. & G. S. West			×			×								×	×		
Staurastrum anatinum Cooke & Wills	×	×	×							×				×	×		
,, ,, var. *Lagerheimii* (Schmidle) nob.			×												×		
,, *Arctiscon* (Ehrenb.) Lund.		×	×					×					×		×		
,, *brachiatum* Ralfs.															×		
,, *brasiliense* Nordst. var. *Lundellii* W. & G. S. West			×												×		
,, *brevispinum* Bréb. var.						×		×			×						

SPECIES.	Cumberland.							Westmorlaud.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Staurastrum curvatum West	×		×		×		×						×	×		×	×
,, *cuspidatum* Bréb. var. *maximum* West	×	×			×		×	×			×		×				×
,, *dejectum* Bréb.			×									×				×	
,, *denticulatum* (Näg.) Arch.			×				×			×		×	×				
,, *erasum* Bréb.									×								
,, *furcigerum* Bréb.		×	×					×				×					
,, *gracile* Ralfs	×																
,, ,, var. *nanum* Wille.								×						×	×		
,, *grande* Bulnh.								×									
,, *hexacerum* (Ehrenb.) Wittr.														×	×		
,, *inflexum* Bréb.														×			
,, *irregulare* W. & G. S. West								×									
,, *jaculiferum* West forma *biradiata*			×							×							
,, ,, forma *triradiata*	×	×					×	×		×		×		×	×		×
,, *longispinum* (Bail.) Arch.			×										×				
,, ,, var. *bidentataum* (Wittr.) W. &. G. S. West			×														
,, *lunatum* Ralfs var. *planctonicum* W. & G. S. West		×	×		×		×		×	×			×				×
,, *Manfeldtii* Delp.			×														
,, *megacanthum* Lund.																×	
,, *mucronatum* Ralfs var. *subtriangulare* W. & G. S. West													×				
,, *Ophiura* Lund.															×		
,, *paradoxum* Meyen	×	×		×			×			×			×				×
,, ,, var. *cingulum* W. & G. S. West												×					
,, ,, var. *longipes* Nordst.	×											×	×			×	×
,, *polymorphum* Bréb.			×														
,, *pseudopelagicum* W. & G. S. West																×	×
,, *punctulatum* Bréb.													×	×	×		
,, *sexangulare* (Bulnh.) Rabenh.			×														
,, *teliferum* Ralfs			×											×	×		
,, *vestitum* Ralfs.															×		
Spondylosium pulchrum (Bail.) Arch. var. *planum* Wolle		×		×	×	×				×	×	×	×				×

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Sphærozosma vertebratum Ralfs var. *punctulatum* W. & G. S. West			×					×									
,, *Aubertianum* West			×														
,, *granulatum* Roy & Biss.			×									×		×	×		
Desmidium Swartzii Ag.													×				
,, *aptogonum* Bréb.																	×
Gymnozyga moniliformis Ehrenb.														×	×		
Hyalotheca dissiliens (Sm.) Bréb.			×	×				×		×				×	×		
,, *Indica* Turn.															×		
,, *mucosa* (Dillw.) Ehrenb.			×					×					×	×	×		
,, *neglecta* Racib.															×		
Eudorina elegans Ehrenb.		×										×	×				×
Pediastrum Boryanum (Turp.) Menegh.												×					×
,, *glanduliferum* Benn.																	×
Crucigenia rectangularis (Näg.) Gay													×				
Scenedesmus bijugatus (Turp.) Kütz.											×		×		×		
Ankistrodesmus falcatus (Corda) Ralfs.														×	×		
Ankistrodesmus falcatus var. *acicularis* (A. Br.) G. S. West														×	×		×
,, ,, var. *spirilliformis* G. S. West						×											
,, *Pfitzeri* (Schröder) G. S. West		×						×	×								
Elakatothrix gelatinosa Wille.							×										
Oocystis lacustris Chodat.											×						×
,, *parva* W. & G. S. West			×				×										
Nephrocytium lunatum West																	×
Dictyosphærium pulchellum Wood			×														×
Botryococcus Braunii Kütz.		×	×								×						×
Glœocystis gigas (Kütz.) Lagerh.	×			×	×		×	×	×	×	×	×				×	×
Sphærocystis Schroeteri Chodat		×					×	×		×	×	×	×				×
Tetraspora lacustris Lemm.																	×
BACILLARIEÆ.																	
Melosira granulata Ralfs.		×															×

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cyclotella compta Kütz	..	..	..	×	..	..	..	..	×	..	..	..	..	..	..	..	×
Rhizosolenia morsa W. & G. S. West	..	..	..	..	..	×	..	..	..	..	..	..	..	..	..	..	×
Tabellaria fenestrata (Lyngb.) Kütz.	×	..	×	×	×	×	..	×	×	×	..	×	..	×	..	×	×
,, ,, var. *asterionelloides* Grun.	..	×	..	..	×	×	..	×	..	..	×	..	×	..	..	..	×
,, *flocculosa* (Roth.) Kütz	×	×	×	×	×	×	×	..	×	×	×	..	×	×	×	×	×
Diatoma elongatum Ag.	..	..	..	..	..	×											
Fragilaria capucina Desmaz.	..	..	..	..	..	..	×	..	..	×	..	..	..	..	..	..	×
,, *crotonensis* (A. M. Edw.) Kitton	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Synedra Ulna (Nitzsch) Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
,, *pulchella* Kütz.	..	..	..	..	×	..	..	..	..	..	..	×	×				
,, *Acus* (Kütz.) Grun.	×	..	..	..	×	..	×	..	..	×	×	×	..	×			
,, *radians* (Kütz.) Grun.	..	..	×	..	×	×	..	..	..	×							
Asterionella formosa Hass.	..	..	×	..	..	..	..	..	..	×	×	..	×	..	..	..	×
,, *gracillima* Heib.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Ceratoneis Arcus (Ehrenb.) Kütz. var. *Amphioxys* (Rabenh.) De Toni	×																
Eunotia lunaris (Ehrenb.) Grun.	×	..	..	..	..	..	×	..	..	..	..	..	..	×	×		
,, *pectinalis* ((Kütz.) Rabenh.	×	..	×	..	..	..	..	..	..	×	..	..	×	×	×	×	
,, *gracilis* (Ehreb.)Rabenh.	..	..	..	..	..	..	×	..	..	..	..	..	..	..	..	×	
,, *major* (W. Sm.) Rabenh.	..	..	×														
,, *biceps* (W. Sm.) G. S. West	..	..	..	..	..	..	..	..	..	..	..	..	..	×			
Navicula major Kütz.	..	..	×	..	..	..	..	×	..	..	..	×	..	×	×	..	×
,, *viridis* Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
,, *gibba* (Ehrenb.) Kütz.	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×		
,, *radiosa* Kütz.	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	×
Stauroneis Phœnicenteron Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Vanheurckia rhomboides (Ehrenb.) Bréb. var. *saxonica* (Rabenh.) G. S. West	..	..	..	..	..	..	×	..	..	..	..	..	..	×	×		
Gomphonema constrictum Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
,, *geminatum* Ag.	..	..	..	..	..	..	×	..	..	..	..	×					
,, *intricatum* Kütz.	..	..	..	..	..	..	×										
,, *olivaceum* (Lyngb.) Kütz.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
Cocconema cymbiforme Ehrenb.	..	..	..	..	..	..	..	..	..	..	..	×	..	..	..	..	×

(*To be continued*).

'A' MR. DARWIN.

REV. W. C. HEY, M.A.

IT is well known that Darwin was first attracted to the study of Natural History by the Coleoptera. My grandfather, the Rev. Samuel Hey (of Ockbrook), was a beetle-collector, and it thus happens that in some old letters I recently looked over, I found two interesting references to the father of modern science. My grandfather, writing to my father (the late Archdeacon Hey), on September 16th., 1829, says :—' Mr. Fox brought over a relative of his, Mr. Darwin, to see my collection. They both pronounced it a very fine collection for so small a one, and discovered in it several very rare insects, and such as they had never before seen. Mr. Darwin, indeed both of them, were captivated with the Snowdon beauties. Mr. Darwin wants to know on what part of Snowdon you took the *Chrysomela cerealis*, and on what plant, as he means to go there on purpose to search for it. This he can readily do, as he lives at Shrewsbury. He named a great many insects for me. I gave them one of my three specimens of *Epaphius*, and he and Mr. Fox were to toss up for it ! '

The other reference occurs in a letter to my father from an aunt. She writes :—' *A* Mr. Darwin has been to see your father's insects.' And with rare discrimination, she adds this mild praise—' He seemed a very intelligent man.' The old lady was a Calvinist after the straitest sort. Could she have dipped into the future, she would *not* have thought it was an angel she had been entertaining unawares, but—well, something quite different.

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Evidently our contributor, Mr. T. Petch, B.Sc., Government Mycologist in Ceylon, is in his old form for work. Amongst the pamphlets recently received from him may be mentioned ' Insects and Fungi ' ; from ' Science Progress ' ; ' The Genus *Endocalyx*, Berkeley and Broome (with plate and description of *E. cinctus* n. sp.), from the Annals of Botany ; and ' Die Pilze von *Hevea brasiliesins* (Para Kautschuk) ' ; from ' Zeitschrift für Pflanzenkrankheiten.'

The following method of collecting aquatic coleoptera, in vogue in America, may be worth trying by our readers interested :—' To collect in flowing streams, a loosely-woven cloth should be stretched across and through the stream, and the stones, gravel and sand overturned and stirred up a short distance above it. The dislodged beetles will be swept into the cloth to which they will cling for support, and it is only necessary to draw up the cloth, and reap the harvest.' The writer adds that on one occasion he secured 700 beetles in this manner, after stirring up about two feet of sand and gravel.

HAWKWEEDS.

JOHN CRYER.

In an interesting article in the 'Journal of Botany' for January and February, the Rev. A. Ley, M.A., dealt with the groups and species of the West Yorkshire hawkweeds and their distribution as far as they have been ascertained. Much work, however, remains to be done before the list of West Yorkshire hawkweeds and the distribution, are at all adequately known. Grassington and the immediate neighbourhood are fairly rich in hawkweeds, as the following list of species gathered by the writer will testify :—

(1) *Hieracium hypochaeroides* Gibs., var. *saxorum* F. J. Hanb.
(2) ,, *britannicum* F. J. Hanb., var. *ovale* Ley.
(3) ,, *silvaticum* Gouan., var. *asymmetricum* Ley.
(4) var. *subcyaneum* W. R. Linton.
(5) ,, *cymbifolium* Purchas.
(6) ,, *duriceps* F. J. Hanb. (Type)
(7) ,, *scanicum* Dahlst.
(8) ,, *sciaphilum*, Uechtr., var. *transiens* nov. var.
(9) ,, *strumosum* sp. nov.
(10) ,, *sparsifolium* Lindeb., var *placerophyllum* Dahlst.
(11) ,, *tridentatum* Fr., var. *acrifolium* Dahlst.
(12) ,, *rigidum* Hartm., var. *calcaricolum* F. J. Hanb.

On comparing the above with Mr. Ley's list it will be noticed that numbers 9, 11, and 12, are not recorded for the West Riding of Yorkshire, and numbers 1, 2, 6, 7 and 8 are not recorded for Wharfedale, and the rest are not recorded for Grassington and the immediate district.

H. sarcophyllum Stenstr. is recorded by Mr. Ley for Langcliff, Ribblesdale. The writer gathered a fine specimen at Malham, August 2nd, 1906, also a specimen of *H. britannicum* F. J. Hanb., var *ovale*, Ley, and one of *H. cerebridens* Dahlst., in the neighbourhood of Malham. Fine specimens of *H. scanicum* Dahlst. were found growing near Leeds in September of last year, along with *H. cacuminatum* Dahlst. Mr. Ley says of this latter, 'rare in Britain.'

H. Gothicum Fr., described by Mr. Ley as 'not common,' was found by the writer in fair abundance near Shipley, August 1907.

H. prenanthoides Vill., grows in abundance near Buckden, and typical *H. anglicum* Fr. is to be found near Buckden and Kettlewell.

Mr. Ley has seen all the above specimens, and I have to acknowledge my indebtedness to him for his generous help in naming them.

YORKSHIRE MOSSES.

C. A. CHEETHAM.

Dicranodontium longirostre B. & S. var. alpinum Schp.

Whilst on a visit to Buckden last November, with Mr. A. R. Sanderson, we found this moss in plenty, high up the hillside where the woods and moors join. It is the *Campylopus alpinus* of 'Lees' Flora,' and this will be a second locality for it, the other being Inglebro', where it occurs in sheets in the turf on the south shoulder.

Mr. A. Wilson, F.L.S., who has found it in West Lancashire on Greygarth and Thrushgill Fells, says that the additional locality is very interesting, and he suggests that it may be found on other high peat-covered fells. On the same occasion we found the var. *calvescens* Hobk. of *Hylocomium squarrosum* B. and S.

Dicranodontium longirostre B. and S.

This is the type of which the above is now considered a variety. It occurs in shade in woods on humus, whilst the variety is found in the open on turf or peat. In January last I found this moss in Guy's Cliff Woods, Pateley Bridge, which is a new drainage area for it, the previous records being:—Wharfe, Bolton Woods, Dr. Wood (I gathered it here last Christmas); Calder, Heptonstall, J. Nowell.

Phascum Flœrkeanum Web. and Mohr.

On the occasion of the annual meeting at Doncaster last December, I gathered this moss in Cusworth Park. It is an additional species to the West Riding list.

Barbula gracilis Schwæg.

A moss which I found at Knaresbro' in May 1908, and which I submitted to the Moss Club as *B. Hornschuchiana* Schultz, has been determined to be the above species by Mr. W. E. Nicholson and Mr. H. N. Dixon, F.L.S. This is also a new species to the West Riding.

ANŒCTANGIUM COMPACTUM Schwæg.

The only locality given in our flora for this is Whernside. On a visit to the upper part of Rawtheydale (Uldale) in February 1909, I saw it in quantity and in very fine 'fruit.'

BARTRAMIA POMIFORMIS Hedw. var, CRISPA B. and S.

In the last-named locality I found this moss, which is new to West Yorkshire. In growth and shape of leaf it is very near to *B. Halleriana* Hedw., which also grows in the district. The two can be better distinguished by habit and colour whilst fresh, than from dried specimens and single leaves.

I am indebted to Mr. W. Ingham, B.A., and the above-mentioned gentlemen for assistance in the verification of these mosses.

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Behind the Veil in Birdland, by **Oliver G. Pike, F.Z.S.** London: The Religious Tract Society. 106 pp., 10/6 net.

In this large and handsome volume Mr. Pike has selected and reproduced twenty-four from his thousands of photographs, and of these, four are of mammals, as they are considered to be in 'Birdland.' The two dozen plates are evidently enlargements from photographs, and presumably are all taken direct from life. Accompanying each plate is some descriptive letterpress; but unfortunately, as with some other bird-photographers, the author dwells far too much upon the hardships and risks and trials of photographing birds; the number of hair-breadth escapes being really appalling. In fact, some of these almost get the flavour of the stories of another kind of naturalist, viz., the one who 'goes a angling'—A gannet nearly knocked him into the sea; it took him two days to get a photograph of a Great-crested Grebe; another two days was occupied in photographing two sparrows, etc. All this is, of course, probably true; but we have seen hundreds of quite as interesting photographs of quite as difficult 'sitters,' which were taken in reasonable time and without any risk to life or limb. The volume is marvellously cheap at half-a-guinea, and we congratulate the author on finding a title that has not been used before—a daily increasing difficulty!

British Butterflies and other Insects. Edited by **Edward Thomas.** London: Hodder & Stoughton. 127 pp., 6/-

'There is a difference between a grub and a butterfly; yet your butterfly was a grub.' Such is the Shakespearian entomological observation quoted in this volume. And we might add—'There is a difference between "British Country Life" and "British Butterflies and other Insects," yet the latter was once part of the former.' And whilst there is nothing to indicate that such is the case, the new book is simply the entomological articles reprinted from Messrs. Hodder and Stoughton's two charming volumes on 'British Country Life' already noticed in these columns. In this present attractive and cheap form, however, our readers will doubtless be glad to have these 'Insect' articles by themselves, and we think the publishers have acted wisely in presenting them in their present form, particularly if it repays them for their enterprise in producing such really admirable books so cheaply. There are articles by A. Collett, G. A. B. Dewar, Richard South, A. W. Rees, and F. P. Smith, all being written in a style redolent of the fields and woods and heaths. The coloured plates from photographs are also well in keeping with the book, and considerably add to its attractiveness.

NOTES ON ROOKS.

F. M. BURTON, F.L.S.,F.G.S.

ROOKS are unusually abundant in the Gainsborough neighbourhood, and, in one way or another, are always in evidence from early morning until darkness sets in at night ; so that opportunities for observation are numerous. Within a radius of about a mile from my house, and, for the most part within half that distance, there are, at least, twenty separate rookeries, big and little ; most of them on the slope of the Keuper escarpment above Gainsborough facing west, and so protected from the cutting easterly winds so common in this district.

When the nesting period is well over, and during the winter months, all the birds roost in woods on the east of the town, repairing there from the low lands of the Trent valley, their favourite feeding-place, in large or small flocks, with a solitary straggler here and there bringing up the rear as the day closes in ; and in the mornings, when daylight returns, they all fly back with loud cawings, to feed in the valley again or on the newly turned-up plough lands. In addition to the worms and grubs of the marshes and plough-lands, anything in the shape of a nut has a special attraction for them ; and they will strip a tree year after year, when once they find it out. I have several solitary walnut trees in the fields around my house, and long before the nuts are ripe and ready to be gathered, the rooks carry them off. I have seen a tree black with these marauders, and have watched the birds flying off with the nuts in their beaks. For a long time I could not make out what they did with them, until one day, on digging into a heap of soil left ready for the garden, some of the nuts turned up. The rooks had learnt that the thick, green coating of walnuts, if buried in the ground, will come off ; and though the nuts by this process are not properly ripe, indeed far from it, I have been obliged to take a lesson from the rooks and follow their example, on the principle of 'half a loaf being better than no bread.' It is not only the walnuts that they steal, but anything suggestive of a nut as well. I have a Turkey Oak on my lawn, the fruit of which, with its rough bristly protection, is regularly attacked by the rooks. Some of the acorns may be carried off and eaten, but, at all events, the greater part is thrown down, and left lying under the tree ; and, whether good for food or not, it is clearly a point of honour with them to strip the tree every year.

Rooks in general avoid the near presence of man. In the winter, however, when the ground is frozen hard or the land buried in snow, they will venture to approach the food put out for the starving birds, using, however, the greatest caution in doing so. I have seldom, even in the worst seasons, seen a rook near my windows, but they will sit on the branches of the trees near the food, and if a piece of bread or anything falls to the ground they will make a dash for it and carry it off. I have seen them sometimes fly close past the stage on which the food is placed, and either seize a piece or knock it off with their wings, and then pick it up. They will also fly after a bird carrying off food in its beak and force it to drop it. In the early mornings too, when no one is about, they will take away the small bones hung out for the Tits. In fact, they steal and bully whenever they can.

The following is an account of the most extraordinary event in the social economy of these birds that I ever met with. The crest of the steep escarpment on the east of Gainsborough, already alluded to, was cut through in the old coaching days to lower the gradient and reduce the slope; the spoil being banked up on the road below, thus raising it up considerably above the fields on its north side. Walking down this road one day, I saw through the hedgerow in one of the fields, a large circle of rooks assembled on the grass, several deep, all with their heads turned towards the centre where one solitary bird was standing. The circle, I should say, was about thirty feet in diameter. Presently, out stepped an old bird from the ring, and with that half-walk, half-flight motion, common to some of the larger birds, went up to the rook in the middle, and attacked it with its beak, stabbing it on the head for about a minute, after which, suddenly the whole body of the birds rose up and flew away leaving the victim alone in the centre. It was not dead, and it tried to stand, supporting itself with its wings; in which way, falling and stumbling as it moved off, it managed to reach the opposite hedge, which was not far off, and I saw no more of it. The gate leading into the field was some distance off, and I had no time to spare. The victim, judging from the size of the old rook which stepped out to kill it, appeared to be a young bird, one perhaps of the first year, inexperienced in rook law.

It would most probably die. That they meant to kill it is certain, and had not my presence, or something else, disturbed them, they would have done it. What it had done I cannot say. It might persistently have stolen twigs from the nests of other birds—a dire offence with rooks—or, perhaps, got at their eggs. Some flagrant breach of rook-law had, doubtless, been committed, and, after trial by a jury of its fellows, it had been condemned to death. It was a remarkable scene, and from the conclave of birds assembled to witness the execution, and their complete and orderly silence, the proceeding had something distinctly impressive about it. Doubtless this tragedy has been witnessed by others, but I should imagine by very few. Mr. W. Warde Fowler in his 'Tales of the Birds,' recounts a similar incident, and, though it is told as a tale, no doubt he either witnessed it himself, or had it from some good and credible source.

The fact of this tragedy having been seen by others, and not being an isolated case, renders it more interesting, as it points to a high state of established order, and even morality, in the lives of these interesting birds and their dealings one with another.

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Mr. Horace B. Woodward, F.R.S., assistant Director of the Geological Survey of England and Wales, retired from public service on December 31st last. We trust that he may long be spared to enjoy his rest from official duties, though doubtless he will still find much to occupy his time.

We learn from 'Nature' that Mr. Silva White, the Assistant Secretary of the British Association, has resigned. At a recent meeting of the Council cordial thanks were expressed to Mr. White, 'but it was resolved that the Assistant Secretary should not be a member of the Council; and as this was the chief condition under which he would continue in office, his resignation was accepted.'

'The Yorkshire Herald' for February 1st, has three columns devoted to 'A Yorkshire Naturalist—Mr. William Hewett and his work, who has collected nearly 40,000 specimens.' It is illustrated by sketches of Mr. Hewett, Sabine's Gull, Puffin, and 'Hewett's swing.' The last is not prophetic, but is from a photograph of Mr. Hewett in mid-air at Buckton, collecting eggs of Guillemot, Razorbill and Puffin. We learn that the British Museum 'take second place' with regard to Guillemot eggs, Mr. Hewett's being the finest collection in the world. He also is said to possess a *complete* collection of British land, marine, and fresh-water shells. In an examination recently on 'Evolution,' Mr. Hewett wrote twenty-three sheets of foolscap in three hours. He has a certificate for shorthand, knows French, and has recently been asked for a summary of his life's work by an American publishing firm. We also learn that the Rev. T. B. B. Ferris, M.A., formerly vicar of St. Thomas's, York, said, in a letter to the 'Herald,' dated April 27th, 1882, 'Mr. Hewett, a most enthusiastic naturalist.' Those who know Mr. Hewett will agree with this; those who don't, won't recognise him again from the "protrait" given in the 'Herald.'

THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.*

DR. WHEELTON HIND, F.R.C.S., F.G.S.

THE choice of an address to a Society consisting of so many sections is an anxious one. Either the address must be on very broad lines, dealing with general principles, or, if technical, and addressed to one section only, the majority of those who are learned in other branches of natural science suffer in the interests of the few. I was told, however, that I was expected to specialise on this occasion, by those whom I dare not disobey, and it seems to me that it will not be amiss to examine the present state of our knowledge of Carboniferous Geology, and to draw attention to important questions which are urgently needing solution, though to compress this subject into a presidential address will be difficult.

In the year 1888 was published a Volume of Reports of the British Sub-Committees on Classification and Nomenclature of the International Geological Congress, in which was amongst others, a 'report on the Carboniferous, Devonian and Old Red Sandstone.' In it are given tables of the general succession of the Carboniferous Rocks in various districts of Great Britain and Ireland, but in only one single instance (p. 143), is even the Generic name of a fossil mentioned.

Since that date, fortunately, our knowledge of Carboniferous palæontology and fossil distribution has advanced, and I think we may claim that to-day the broad lines of life zones of the Carboniferous Rocks have been laid down, and firmly established on a sound footing, and the work of the future will have a foundation on which to build.

To-day it is a fairly easy task to read the sequence in any district, and on broad lines to correlate one district with another. In the first place, it is important to recognise that the lower Carboniferous Rocks were deposited on a sinking land of very irregular surface, so that portions only sank beneath the waves in time to receive deposits characterised by a fauna younger than that which obtains in the older beds. This fact is well illustrated by the comparison of the Bristol and North Wales Carboniferous Limestone series. The basement conglomerate of North Wales is succeeded by *Seminula* beds, a sub-division of which is comparatively high up in the Bristol succession.

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* Being the Presidential Address to the Yorkshire Naturalists' Union, delivered at Doncaster, December 10th, 1908.

Many of the present difficulties of British Carboniferous Stratigraphy are due to the fact that portions of the British Isles were dry land throughout the whole Carboniferous period. The whole of the North of Scotland, the Southern Uplands, the Lake District, parts of North-west and Mid Wales and Shropshire, the Mourne Mountains, and parts of Co. Wicklow, were not submerged even in lower Carboniferous times.

Out to the East, over Belgium, the Carboniferous sea was laying down deposits of Limestone, which can now be correlated with the lowest part of the Bristol Series, but still further East, in Germany, practically none of the lower Carboniferous Rocks are found at all, and the Carboniferous Series there commences with the Culm, containing a fauna which identifies those beds with the Pendleside Series of the Midlands.

In Russia, the lowest part of the Carboniferous Limestone is characterised by a fauna (*Productus giganteus*) which is associated in Belgium and Great Britain with the highest beds of the Series.

Not only locally, therefore, in the British Isles, but also across Europe there is an extensive overlap of the higher members of the Carboniferous Series, and it is of the utmost importance to work out the causes and conditions of this overlap, this question being one of world-wide inportance. It would seem, too, that the key to the riddle is in the County of Yorkshire, and that the solution of the problem of the relationship of the Yoredale Series and the Pendleside group will go far to settle the whole question of European Carboniferous Geology.

The succession of Carboniferous Rocks in the Bristol area has been described in detail by Dr. Vaughan.* The Avon gorge shews, with one fault and one slight repetition, a complete sequence of the Carboniferous Limestone series. Since that publication, Dr. Vaughan, Dr. Sibly and others have shewn that a similar sequence exists in the Mendips and in South Wales. Dr. Vaughan was able to shew that the whole sequence could be divided into broad life zones by the study of the Corals and Brachiopods, and that these life zones could be traced through South Wales. And there is very little doubt that these life zones exist in Belgium, and that it will be a comparatively easy matter to correlate with some approach to exactness, the Carboniferous Limestone Series of the Meuse and Bristol, a view expressed by Lohest, many years ago, and previous to the publication of Dr. Vaughan's work.

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* Q. J. Geological Soc., Vol. LXI., pp. 181-307.

Dr. Vaughan shews the Bristol sequence to be about 2300 feet thick, and thus he sub-divides it as follows :—

About 100 feet	E	
VISEAN.		
Dibunophyllum	D 2	400 feet
,,	D 1	
Seminula	S 2	850 ,,
,,	S 1	
TOURNAISIAN.		
Syringothysis		250 ,,
Zaphrentis	Z 2	350 ,,
,,	Z 1	
Cleistopora	K	360 ,,
Modiola	M	100 ,,

Speaking generally, the fauna of the Bristol area is not rich in genera or species, except in Corals and Brachiopoda ; Lamellibranchs, Gasteropoda, and Cephalopoda are exceedingly rare. Fish remains occur abundantly at certain horizons, but are rare in the *Dibunophyllum* beds. There are no shellbeds, such as are not uncommon in the Upper Limestones of the Midlands, indeed there is a very great difference in the faunas of the *Dibunophyllum* beds in these two areas, both in numbers of species, genera, and individuals.

In the Bristol district the *Dibunophyllum* beds pass up into a series attaining about 100 feet of limestone, which Dr. Vaughan has classed as (*E*.), which are characterised by brachiopods of a late *Dibunophyllum* type, which are common also in the Midland area. And on these limestones repose the so-called Millstone Grits of the British district, said to be about 980 feet thick, on which lie the Coal Measures, which, from the flora, would seem to represent only the upper moiety of the Coal Measures of the Midlands. Mr. Bolton has published the description of marine bands and their fauna passed through in an exploration heading at the Ashton Vale Colliery.*

Unfortunately we know nothing more of the fauna or flora of this 900 feet of beds. The fauna of the marine band described by Mr. Bolton, has some resemblance to that associated with the Gin Mine of the North Staffordshire Coalfield, and the latter bed is fairly high up in the Coal Measures of that Coalfield. The fish fauna is decidedly of a Coal Measure facies, and Mr. Bolton remarks that Plant remains of a Coal Measure type occur in black shale, a few feet below the marine bands. When compared to the Carboniferous succession in the Midlands where the *Dibunophyllum* zone is succe ded by more than 1000 feet of the Pendleside Series, and these beds in turn are overlaid by from 300–3000 feet of Millstone Grit, and that the Gin mine lies 5000 feet above the base of the Coal Measures in North Staffordshire, the question arises at once as to what do these 900 feet of Millstone Grit of Bristol really represent ?

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* Q. J. Geol. Soc., Vol. LXII., pp. 445-469.

Dr. Kidston has shewn that the greater part of the Coal Measures of the Bristol area are represented by a Flora of high facies, and I am of opinion ,from the evidence of the Mollusca, that the Pennant Series of coals correspond to the Black Band Series, and that portion of the Coal Measures immediately below them. Therefore the 900 feet of Grits represent, in point of time, all the Series between the *Dibunophyllum* beds, and a horizon high up in the Coal Measures.

A marine band has been discovered in the South Wales Coalfield, near its base at Glan, Rhymney, and Beaufort. This probably represents the marine band described by Mr. Bolton.

We also now know that the genus Zaphrentis is not confined to the lower beds in other areas, but in the Midland province and Scotland the same species which characterises the *Zaphrentis* zone of the Bristol area, occur with other species of this genus in the Upper *Dibunophyllum* beds.*

CLEE HILL AREA.

The Carboniferous Limestone of the Clee Hill Area rests conformably on a series of upper Devonian rocks. The limestones exposed at Oreton and Farlow would appear, from the fauna contained in them to belong to Zaphentis division of the Bristol sequence. These limestones are succeeded by some shaly beds which in turn are overlaid by a Millstone Grit and the Clee Hill Coal Measures.

There is no question that the age of the Coalfield is other than Coal Measures, a fact demonstrated by the flora, so that in this area there must be an unconformity to account for the absence of the whole of the Visean group of the Carboniferous Limestone,

---

* *Vide* Carruthers, 'Geol. Mag.', Dec. v., Vol.V., pp. 63 and 158.

NORTH WALES.[1]

Mr. Stobbs and I have shewn that the Carboniferous Limestone Succession in North Wales approximates much more to the Midland type than to that of the Bristol area. The principal point of importance that we made out was the absence of the whole of the lower part of the Bristol sequence, the basement conglomerate being succeeded by Limestones of various horizons in the Visean; and that in the most extreme cases, only about 500 feet of *Seminula* beds are represented. We were able to shew that the lowest Limestones of North Wales are characterised when present, by the presence of *Daviesiella Llangollensis.*

In certain localities Craignant, Llannt, Bron y Garth, Hafod near Corwen, Fron y Cysyllte, the *Seminula* beds are absent, and there is an overlap of *Dibunophyllum* beds, which rest unconformably on Silurian and Ordovician rocks.

Towards the top of the *Dibunophyllum* zone the beds become cherty in places, and a sub-zone distinguished by the presence of *Cyathaxonia* and *Amplexi-zaphrentis* is developed.

The Limestones are succeeded at Teilia and Prestatyn by the Teilia beds, a series of thin limestones and shales, containing a typical Pendleside fauna and flora, and probably in places, some of the regularly and thinly bedded Pendleside Limestone have been replaced by Cherts.

The Cherts of North Wales, therefore, are in the upper part of the *Dibunophyllum* and *Cyathaxonia* zones, and in the lower part of the Pendleside Series.

At Allinson's quarry, near Oswestry Racecourse, and near Bwlch Gwyn, north of Minera and at Halkin Mountain, the cherts contain corals, *Cyathaxonia* and *Brachiopoda,* and are certainly part of the Carboniferous Limestone.

The succession in North Wales may be explained as follows:

Coal Measures belonging to the Lower Coal Measures of Lancashire, about the Arley Seam, and with the marine beds of *Gastrioceras listeri* in any area.
Sandy Shales.
Pendleside Series of Teilia and Holywell.
Cyathaxonia beds.
Upper *Dibunophyllum.*
Lower *Dlbunophyllum.*
Seminula beds.
Basement Conglomerate.

The Pendleside Series of Teilia and the Holywell and

---

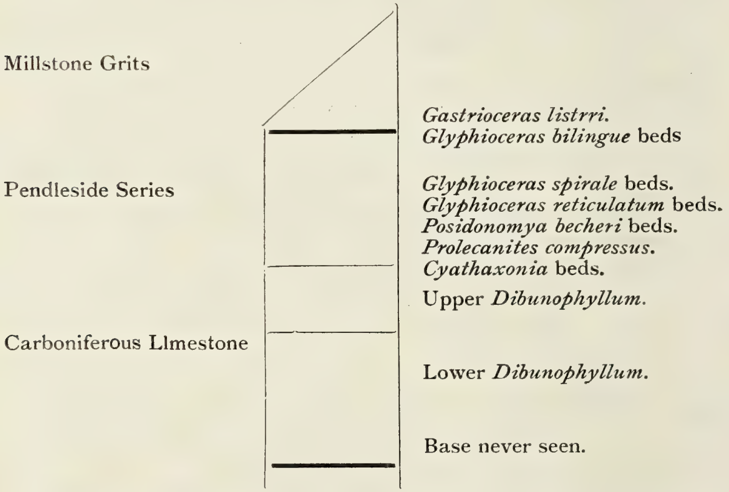
[1] 9019 April 1.

Bagillt road, Nant-figilt afford an exposure of about 1000 feet, and yield a typical Pendleside fauna. They are succeeded by sandy and micaceous shales of Talacre dingle, and these are overlaid by the Gwespyr sandstone, which is a very thick bed of sandstone full of plant remains in a detrital state.

I consider it probable that the Gwespyr sandstone is the representative of the Millstone Grit, but we have no fossil evidence yet whether this is a Sandstone above or below that horizon, but there is little doubt that the Coal Measures of North Flint contain the representative of the Arley mine of the Lancashire Coalfield.

THE MIDLANDS.

The Carboniferous sequence of the Midlands is important. The area over which this particular sequence obtains extends from Ashbourne in Derbyshire to Settle in Yorkshire, and is represented in the following diagram:—



The base of the Limestone has never been seen, and owing to the Tectonic structure of the area, we are totally ignorant of the thickness of the Limestone, or on what rocks it is superposed. Having collected Carboniferous Limestone fossils for many years in this area, I was aware that I had never obtained a fauna from which *Productus giganteus* was absent, and that the upper part of the Series was very rich in those corals which Dr. Vaughan associated with the *Dibunophyllum* zone.

Dr. Silby * obtained very similar results in his study of the southern part of the district, and filled in several details. I have not been able to satisfy myself that any beds of a lower facies than the *Dibunophyllum* zone exist in Derbyshire, but the exposure of Settle reveals some *Seminula* beds underlying beds with a typical *Dibunophyllum* fauna.

The interesting point in Dr. Sibly's paper is the recognition of the wide vertical expansion of the *Dibunophyllum* zone in the North Staffordshire-Derbyshire district, which measures, according to him, at least 1700 feet ; whereas in the Bristol district, the whole zone is represented by only between 400—500 feet of limestones.

The Limestone with cherts, characterised by the presence of *Cyathaxonia* and other small corals, is well developed on the Staffordshire side of the anticlinal, and reaches near Warslow and Wetton 100-150 feet in thickness. At Wetton (Pepper Inn), and Butterton, North Staffordshire, these beds are overlaid conformably by black shales and Limestones, with a typical Pendleside fauna, *Pterinopecten papyraceus, Posidonomya becheri, Nomismoceras rotiforme, Glyphioceras striatum,* indicating the lowest zone of that series. Here the succession in the Upper *Dibunophyllum* Series is very similar to North Wales. Cherty in places, it is succeeded by a *Cyathaxonia* zone also cherty, passing conformably into the lowest Pendleside zone.

Beds with a similar faunal sequence are to be seen at many places further North. The Hodder Valley, Winterburn, Lothersdale, the Cracoe Hills and near Settle.

This large Derbyshire-Staffordshire Carboniferous area is also remarkable because of the enormous development of the Series of rock to which Mr. Howe and I gave the name Pendleside Series. This Series, in the Midlands, consists of a group of dark limestones and shales at the base, passing up into their well bedded dark limestones, which are succeeded by a black shale group, Then the shales become sandy, and pass up into standstones, ganister-like grits, and are overlaid by the Millstone Grit series. I estimate the extreme thickness of these beds to be about 1200 feet, and the greatest thickness seems to be at Pendle Hill.

The Series is of interest because it can be accurately zoned by a succession of cephalopod forms, which appear to indicate definite horizons which can be traced from the centre of Europe to the West coast of Ireland.

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* 1909 April 1

The Series appears to thin out rapidly south of Stoke-on-Trent, and North of Settle, the characteristic fauna has not yet been found in any beds between Settle and the Valley of the Clyde. The series also thins out to the West, being represented on the West coast of Ireland by about 80 feet of dark shales with calcareous nodules, and apparently representing the middle part of the Series. the characteristic Goniatites being *Glyphioceras reticulatum* and *G. diadema.* No trace of the fauna has been found in the Ingleboro' area, where Mr. Cosmo Johns has demonstrated the following succession :—Upper *Dibunophyllum,* Lower *Dibunophyllum, Seminula* beds, Basement Conglomerate.

A change in the method and character of deposition has set in between Settle and Ingleboro', which is of great importance. Within these few miles the lithological and faunal character of the sequence has largely altered, a fact well recognised by the older geologists with regard to the lithology, but the faunal change was not at all appreciated.

About the latitude of Settle the rich cephalopod fauna and the characteristic limestones and shales of the Pendleside Series disappear, and no trace has been found of them in the Yoredale Series. Moreover, wherever the Pendleside Series occurs it succeeds a Visean fauna of the highest facies.

The coral fauna which always underlies the *Posidonomya becheri* beds, throughout the area in which it is developed, consists of *Cladochonus bacillaris, Michilinia tenuisepta, Zaphrentis Enniskilleni,* and other species of the genera *Amplexi-zaphrentis* and *Cyathaxonia,* but in addition the Upper Visean beds of the Pendleside area are very rich in brachiopoda, Mollusca and Fish Remains. For example, a rich fish fauna is found in the Red beds or the highest limestones of the Yoredale Series in Wensleydale, and this fauna differs entirely from the fish fauna of the Pendleside Series, and agrees very markedly with the fish fauna found in the upper part of the limestone of Derbyshire and Staffordshire.

(To be continued).

◆

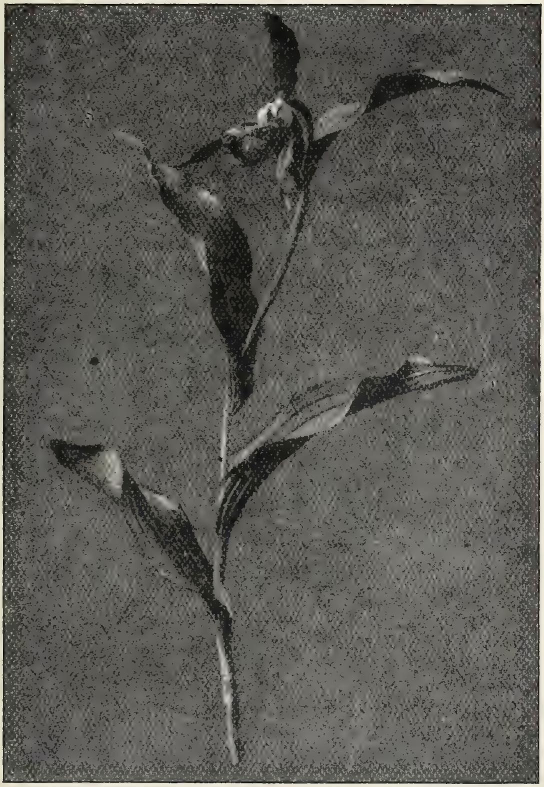
The Yorkshire Wild Birds' and Eggs' Protection Committee begs to acknowledge the receipt of two guineas from the Royal Society for the Protection of Birds.

We are glad to see that Mr. G. W. Lamplugh, F.R.S., has been elected a Vice-President of the Geological Society. Professor W. W. Watts has been similarly honoured, his place as Secretary having been taken by Dr. A. Smith Woodward.

REVIEWS AND BOOK NOTICES.

Richmondshire: an account of its History and Antiquities, Characters and Customs, Legendary Lore, and Natural History, by **Edmund Bogg.** Leeds: James Miles. 696 + xxiii. pp., price 7/6 net.

This is not a dear book, and doubtless many of the readers of this journal who have joined the rambles of the County Naturalists' Union in recent years, will welcome it. Amongst the 240 illustrations from photographs and drawings are many familiar places. Most of these are easily recognisable, though that labelled 'William Horne, F.G.S.' of Leyburn, sat in his 'bleeding' chair, would never have been identified were it not for the name given. The first chapter is 'A Geological Sketch of Richmondshire,' by the Rev. J. C. Fowler. With him, we agree that 'it is difficult in a few pages, to give an adequate outline of such a wide and broken district of hill and dale as Richmondshire,' and in his 6¼ pages (including illustrations), he has not done justice to the subject. So 'sketchy' is this 'brief sketch' that it would have been better omitted. There is a 'Pterodactyl (chalk)' figured, a 'Carboniferous' ammonite, etc. We are not quite sure what is meant by the sentence—'the causes of the Glacial phenomena are in theory and various, one of the latest ideas being that the sun is a variable star.'



The Lady's Slipper Orchis.

There are two 'Botanical Sketches' (of 'Richmondshire' and 'Wensleydale' respectively), by F. Arnold Lees. These are all that can be desired, are written in a pleasant style, and, of course, are most reliable. The description of the lady's slipper orchis is not accompanied by quite the number of adjectives that we should have expected from this enthusiast! An excellent illustration is given of the specimen gathered in 1907, which we are kindly permitted to reproduce. These botanical notes, together with the geological chapter already referred to, seem to comprise the 'natural history' section of the volume. Mr. Bogg's own work is in his familiar style. He has obviously well traversed the ground he describes; he has also consulted the literature dealing with the places he refers to, and thus gives a pretty full account of the attractions of Richmondshire and its borders. Now and then the 'yarns' which are included in order to give the work an interest, seem almost to have been 'dragged in'; but they are pardonable.

In their 'English Literature for Secondary Schools' Series, Messrs. MacMillan and Co. have recently published **'Selections from White's Natural History of Selborne,'** under the Editorship of T. A. Brunton, M.A., of the Manchester Grammar School (136 pp., cloth, 1/-). The book contains thirty of White's letters, which are illustrated by blocks from photographs by T. A. Metcalfe and others. Such volumes as this should do much to increase an interest in Nature amongst the scholars in our secondary schools.

Richard Jefferies: His Life and Work, by **Edward Thomas.** Hutchinson & Co. 340 pp., 10/- net.

Notwithstanding the fact that other writers have referred to Richard Jefferies and his work, we think the present volume, by Mr. Thomas, occupies a place quite apart from the others. It is most welcome. The author is a sympathetic and appreciative follower of Jefferies, and seems to have quite grasped Jefferies' feelings and sentiments. He has lived, too, for over twenty years in that part of Wiltshire that Jefferies knew so well; and from the country people there has gathered much interesting information relating to Jefferies and his family. From Mr. Thomas's previous publications, notably 'The Book of the Open Air,' already referred to in these columns, he is evidently the right man as Jefferies' biographer. He deals at some length with the ancestry, childhood, youth and earlier life of his subject, and then in turn deals with his first novels, first country essays, first country books, etc. There is an excellent bibliography, and the volume is illustrated by reproductions of portraits, a facsimile letter, etc. To read Mr. Thomas's volume is a pleasure, and results, if possible, in appreciating Jefferies' works even more.

We have received No. 8 of **Orkney and Shetland Old-Lore** (The King's Weigh House, Thomas Street, Grosvenor Square, London), an admirable publication; which we recently referred to in these columns. It deals with several matters of interest to antiquaries and folk-lorists. To shew that the publication is by no means 'dry,' we give an extract from a paper on 'Orkney Dialect,' which we think our readers will be able to follow:—Twa feuly ald Orkna billies tullzied aboot a peerie uddie bit o' a plantacreu an' hed a laa plea ower 'id i' the Coort o' Session. The ane 'at waas soomoned gaed bae mistak till the tither's laaweer. Da scoondrel waas ower ceeval an' telt da man 'at he waas wirkan for da tither, bit wad gae 'im a letter intradeusan 'im tae anither honest (?) aaweer 'at wad be blide tae tak ap 'is case. Da man set awa wi' da letter, bit on 'is wey he tou't he wad hae a leuk at her jeust for a' the warl as gin he'd been a ald wife. The letter waasna lang bit sheu waas tae the point, for sheu jeust said: 'Twa Orkna fat geese; pluck thu the ane an' I'se pluck the ither.' Bae me singan certy dat billy got siccan a gluff dat he gaed straight tae the tither ane an' dey settled da ploy atween themsels baith an' hed a foy ower id.'

A Monograph of the British Desmidiaceæ, by **W. West, F.L.S., and G. S. West, M.A., F.L.S., A.R.C.S.** Vol. III. Ray Society. 274 pp., 31 plates, price 25/- net.

The third volume of this useful work has appeared, and is devoted entirely to the genus *Cosmarium*, of which fifty species, and a number of varieties were figured and described in the second volume. To these the present volume adds 174 additional species, with a considerable number of varieties. From some remarks in the introduction (Vol. I.), in which the authors suggested that the genus *Cosmarium* might some day have to be split up into smaller genera, one may infer that they feel this number to be out of all proportion to its importance, and in this we are disposed to agree, though we think there may be some difference of opinion as to the suggested remedy. A careful examination of the descriptions and plates of this genus does not encourage the idea of finding sound grounds for generic differences, but rather suggests that even for specific and varietal discrimination, the most has been made of some minute points of difference.

The author says (page 128) 'We are gradually arriving at the conviction that external form is the dominating factor in the determination of the species groups in Desmids.' Along side this extract, we quote from the description of *Cosmarium regnesi* (Plate 78)—'the new semicells regain the more pronounced character of the species after having partially lost it by repeated divisions.' This appears to be an admission that the external form is liable to mutation at different periods of its life history.

It is evident that every fresh form that is described as a new species does, as a matter of fact, something to bridge over the differences between certain other species, and as this process is continually going on, a time will inevitably come when it will be necessary to recognise that the number of real species is very limited, and that much simplification of the study of this genus may be obtained by a judicious process of 'lumping.'

But before this can be undertaken successfully, there remains much work to be done in watching the growth and development of many of the forms. In many cases we notice Messrs. West add the significant remark—'Zygospore unknown.' Perhaps some of our local students of the fresh water Algæ will take the hint, for in Yorkshire, notably in the moorland districts of the West and North Ridings, we have a very considerable Desmid Flora.

Of the plates accompanying the present volume, it is sufficient to say that they fully maintain the clearness and delicacy which are such marked characteristics of the previous volumes. We notice nothing is said as to any further issue, but, judging by the extent of ground already covered, and the genera that have not yet been described, one may presume that another volume (or perhaps two) will appear in due course. R. H. P.

We have received from Messrs. J. M. Dent & Co., the first part of '**Trees and Shrubs of the British Isles, Native and Acclimatised,**' by **C. S. Cooper** and **W. P. Westell,** and coloured and 'black and white' plates from drawings by C. F. Newell. The work is to be completed in sixteen parts at 1/- net each. The frontispiece is a coloured representation of the Strawberry tree; and there are a number of 'black and white' plates, shewing the structures of leaves, etc.; the drawing of some of which might be improved. With each species is given a description of its distribution, flowers, leaves, etc. We cannot find any new features in the work, but when complete, it will form a large, attractive and cheap volume.

We have received the **Records of Meteorological Observations** taken at the Observatory, Edgbaston, 1908, by **Alfred Cresswell.** It is issued by the Birmingham and Midland Institute Scientific Society, is sold at two shillings; and whilst it is not a pamphlet that will be read from cover to cover, it certainly contains a very valuable record of systematic observations. The pity is that similar publications are not issued from many other districts.

NORTHERN NEWS.

The price of 'The Country Side' has been doubled.

A contemporary sends an 'invitation to our blind readers.'

A photograph of 'A Tame Wild Squirrel' appears in a contemporary.

We are glad to see from several West Riding newspapers that credit is due to the Crosshills Naturalists' Society 'for discovering the lesser shrew on the edge of Rombalds Moor, last records of *such a bird* going back about twenty years.'

In Memoriam. 'The Naturalists' Quarterly Review' (Dartford), referred to in these columns in anything but affectionate terms, closed its career with its eighth number. Its loss is mourned by the publisher and Mr. P. W. Westell. No flowers. R. I. P.

We notice from 'The Museum News' that Mr. F. A. Lucas is to give a lecture at the Brooklyn Institute on 'The Coming Extermination of the Elephant.' We hope the forthcoming big-game hunt of the ex-president of the United States is not to be quite so serious.

We are glad to see from a report of a recent lecture in Leeds, that 'the lecture was followed by a large number of exhibits of foraminifera and polycystina of species of a genus or of examples of Geneva, so that the members might get an understanding of how, with inheritance, variation invariably follows.'

In the *Eastern Morning News* of March 8th, the 'Discovery of a New Elephant' is announced as having been made in Japan. 'It occurs as small yellow or red crystals,' and 'has been appropriately named Nipporium. Its symbol will be Np., and its atomic weight has been ascertained to be probably 100. Evidently 'Nipporium' is Latin for 'Little Nipper.'

Lady Isabel Browne contributes an exceedingly valuable paper on 'The Phylogeny and Inter-relationships of the Pteridophyta' to the 'New Phytologist,' part VII. of which appears in the February issue. That it is not meant for the 'man (or woman) in the street' is obvious from the two following sentences taken at random in this lengthy paper:—'A similar shifting in other directions might have brought about the adaxial position of the Spenophyllaceous sporangiophore, or having produced a marginal and abaxial position of the sorus from an adaxial position. If Mr. Tansley is right in regarding the branching of the frond of many Botryopterideæ in more than one plane as a vestige of a primitively radial construction the branching of the Sporophylls of some Sphenopyllales in the dorsiventral and lateral planes may be an indication of primitavely radial symmetry.'

From the Lancashire newspapers we learn that 'a unique fossil' has recently been found in South Lancashire. At the meeting of the Manchester Geological and Mining Society, recently, Mr. Alfred J. Tonge exhibited a portion of the impression of a fossil tree which has been found in the Chequerbent Arley Mine of the Hulton Collieries, at a depth of 250 yards from the surface. 'It is remarkable,' Mr. Tonge said, 'from the fact that the tree has been traced for a length of 115 feet. It is a lepidodendron. It is lying in the bassy shales about three feet above the Arley seam, and is of flattened ovate form. The measurement, taken at a distance of 14 feet from the root end, gives a width across at that point of 2 feet 10 inches or measured along the circumference of the bark a little over 3 feet. The Chairman said the specimen seemed to be unique on account of its length and slenderness. It was characteristic of this kind of fossil for the bark to be preserved when the woody portion of the tree had disappeared. *It was so with the first fossil remains of an animal found by Sir Charles Lyell ! !*

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NOTES AND COMMENTS.

SPEETON AND SOUTH AFRICA.

We have recently received Vol. VII., Part 2 of the Annals of the South African Museum, which is devoted to 'Descriptions of the Palæontological Material collected by the Members of the Geological Survey of Cape Colony and others,' and contains an elaborate paper on 'The Invertebrate Fauna and Palæontological Relations of the Uitenhage Series,' by Dr. F. L. Kitchin.* On glancing at the plates at the end of the volume, the striking resemblance with the fossils of the Speeton series is at once observed. Dr. Kitchin, in his remarkably full and critical review of the various memoirs dealing with the Uitenhage series, rejects the theories of the Liassic and Jurassic age of the beds, and brings forward very good evidence to shew that they are of Lower Cretaceous age, justly advocating that the evidence of the Cephalopoda must carry the greatest weight in arriving at a decision. The author then discusses the evidence afforded by each individual species, and unquestionably makes out a very good case. He is also very much up-to-date with regard to the literature of the subject, and has even drawn upon specimens from Yorkshire museums and private collections in working up his case. In this connection it is remarkable to find, for instance, that *Holcostephanus atherstoni* of Sharpe, from South Africa, is practically identical with the *Olcostephanus* (*Astieria*) *asteria* described by Mr. C. G. Danford in the Yorkshire Geological Society's Proceedings for 1906, (publ. 1907). To find this extraordinary similarity between specimens occurring in so widely divided districts as Yorkshire and South Africa is certainly surprising. In conclusion, we should like to take this opportunity of congratulating Dr. Kitchin upon the thoroughness with which he has prepared this important contribution to palæontology.

AFRICAN FUNGI.

Mr. W. N. Cheesman, F.L.S., of Selby, who joined the British Association at South Africa in 1905, made an extensive collection of fungi. This included no fewer than twenty-five new to the flora of Africa, one being new to science. In the Linnean Society's Journal for February 1909, Mr. Cheesman describes these finds, and in the same publication Mr. Thomas Gibbs gives a Note on the Coprophilous fungi, in which he describes the new species under the name of *Coprinus cheesmani*.

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* West, Newman & Co., London. pp. 12-250, plates, price 12/6.

SEEDS FROM PEAT.

From the same journal we have received a reprint of a useful paper 'On a Method of Disintegrating Peat and other Deposits containing Fossil Seeds,' by Mrs. E. M. Reid, B.Sc. The excellent work accomplished by Mr. Clement Reid, F.R.S., and Mrs. Reid is well known ; hence the present contribution is most welcome. It has been found that by boiling peat with about equal quantities of dehydrated soda, it becomes quite disintegrated, and the most fragile of seeds and other plant remains are uninjured. In this way specimens of peat from Hornsea, Bielsbeck, Kirmington and other places, which formerly were quite intractable, have been made to yield a large series of plant seeds, etc.

◆

In 'Man' for March, Mr. J. R. Mortimer contributes a note on 'The Stature and Cephalic Index of the Pre-historic Men, whose Remains are preserved in the Mortimer Museum, Driffield.' In this he shews that the early long-headed, or dolichocephalic individuals were an inch taller than the round-headed or brachycephalic individuals.

Who were the Romans, by **Prof. William Ridgeway,** is the title of a clever essay published by the British Academy (Oxford University Press, 44 pp., 2/6.) In it Prof. Ridgeway shews that the old idea that the Romans were an homogeneous people, there being no ethnical distinction between Patricians and Plebians has, at any rate, the advantage of simplicity ; but as in so many problems of natural science, so in history does it often occur that the more the matter is probed, the more complicated it becomes. In his characteristically masterly manner, the author gives an account of the early occupants of the Mediterranean region, and traces their growth and change as time went on.

The Care of Natural Monuments, by **H. Corwentz.** Cambridge University Press. 185 pp. 2/6 net. This is a further contribution to the subject dealt with by Prof. Baldwin Brown, in his book on 'The Care of Ancient Monuments,' which was noticed in these columns when it was published. The present volume is the outcome of a paper read by Mr. Conwentz at the Leicester meeting of the British Association, and deals with the preservation of all manner of natural features, giving special reference to the methods in vogue in England and Germany. Evidently they look after these things well in Germany. A collector of a large number of specimens of the Lady's Slipper Orchis has there been sentenced to a fortnight's imprisonment, notwithstanding that he had not been previously convicted. The question of publishing 'distribution' maps, etc. is also discussed, and it is pointed out that soon after the publication of a map shewing the nesting sites of rare birds, dealers flocked there in search of eggs. A graceful tribute is paid to the work of the Yorkshire Naturalists' Union, and the methods it adopts for preserving the fauna and flora, and of recording the physical features of the county. A word of praise is also meted out in favour of the authors of the maps and memoirs dealing with botanical survey ; in which work Yorkshire has taken an active part. Mr. Conwentz regards these as 'a standard of voluntary work, which has not been attained in any other country.' The book concludes with the quotation from Shakespeare—'who is here so vile that will not love his country.' Quite so, but there must be many such, or all the legislation would not be needed.

THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.

Dr. WHEELTON HIND, F.R.C.S., F.G.S.

(*Continued from page 156*).

The whole fauna of the Yoredale Series is a Carboniferous Limestone fauna, and not a Pendleside fauna. This question of the relation of the Yoredale Series to the Pendleside Series is one of the greatest importance, and one that I believe work in this county of Yorkshire alone will settle.

To understand this matter, a correct conception of the Yoredale phase of Carboniferous Limestone deposit is essential. In the Midland province the Carboniferous Limestone is practically one mass, but as the beds pass North, the limestones are in part replaced by intercalations of shales and sandstones, and this replacement at the expense of the limestone increases as the Series is traced North ; that is to say beds of detrital material are substituted for organic, and this change indicates the influence of land whence were derived the grits and muds which separate the limestones.

How far the *Seminula* beds, which lie under Ingleboro, can be traced North is a question for future investigation, but Prof. Garwood has shewn that *Seminula* beds exist at the base of the Carboniferous Limestone Series at Arnside and Kendal, and Mr. Cosmo Johns that a small patch of probably Tournaisian beds is preserved in Pinskey Gill in Ravenstondale.

NORTHUMBERLAND.

I believe work is now being carried on in Northumberland which will settle the sequence there. At any rate, in Durham and Northumberland a *Dibunophyllum* fauna extends right up to the Millstone Grit of that area.

Dibunophyllum, Cyclophyllum, Lonsdaleia, and other Corals are found in abundance in the Main Limestone of that district, together with a rich Visean fauna, and there can be no doubt that the whole Yoredale phase of the area is typically Upper *Dibunophyllum.*

The Northumbrian sequence of Carboniferous rocks differs considerably from those which obtain further south. I quote Prof. Lebour's account given in the appendix of his handbook on 'The Geology and Natural History of Northumberland

and Durham, and the Memoirs of the Geological Survey on Parts of Northumberland,' which, though not based on palæontological lines, will serve to shew the lithological succession :—

CALCAREOUS SERIES.

Fell Top or Upper Calcareous division (From Millstone Grit to horizon of Great Limestone) 350-1200 feet.

Calcareous division from the Base of the Great Limestone to the bottom of the Dun or Redesdale Limestone inclusive, 1300-2500 feet.

SCREMERSTON.

Carbonaceous Division.—From the Dun Limestone to the top of the Tuedian Grits, 800-2500 feet.

TWEEDIAN.

Fell Sandstones.
Cement Stone Beds and Rothbury Limestones.
Lower Freestones.
Basement Bed in all from 1000-5100 feet.

One immense change has taken place with regard to the lower part of the Series, Calcareous deposits being almost entirely replaced by detrital sediments, in which marine fossils are rare. A second, not shewn in the scheme, is the number of seams of coal which are found through the series.

The division into Calcareous and Carbonaceous is convenient only, but it has no palæontological basis. The whole of the Calcareous Series I consider belongs to the Upper *Dibunophyllum* zone, together with possibly all but certainly the greater portion of the Scremerston or Carbonaceous division. In the Memoir of the Geological Survey on Berwick-on-Tweed, Mr. Gunn stated (p. 17), that the total thickness of the Calcareous division down to the Dun or Redesdale Limestone is 1500 feet. There must therefore be a very great expansion of the *Dibunophyllum* zone in this area. Probably, however, owing to the detrital nature of the deposit and the relative paucity of limestone, deposition took place at a much quicker rate than in areas receiving mainly a pure calcareous or organic deposit.

The various memoirs of the Geological Survey give lists of fossils from the various divisions of the Carboniferous rocks in Northumberland. The list in 'The Geology of Plashetts and Kielder,' p. 12-15 of the Carboniferous Series is without doubt characteristic of *Dibunophyllum* fauna, and no other.

The figures I have quoted as representing the thicknesses of each sub-division are those given by Prof. Lebour (Op. supra cit.), so that the *Dibunophyllum* zone, most of which is the upper sub-division, has an extent of from 1650-3700 feet throughout which *Productus giganteus* ranges.

The question of the homotaxial equivalent of the Tuedian group will be more difficult to settle. They have a great affinity lithologically, and palæontologically, with the Carboniferous Sandstone Series of the East of Scotland, of which the plant remains give very valuable evidence, but those groups of fossils on which at the present time we rely as zonal indexes for the Limestone are practically absent, owing to the nature of the deposit. But having determined the horizon of the lowest coral and brachiopod bearing limestone, it will not be impossible to assume the relative age of sandstone which immediately underlies it.

EAST OF SCOTLAND.

The Lower Carboniferous succession of the East of Scotland, consists of the following members :—

Carboniferous Limestone Series.
Upper Limestone group
Coal-bearing group.
Lower Limestone group.

Calciferous Sandstone Series.
Burdiehouse Limestone group.
Cement Stone group.

The succession and palæontology of these beds have been well worked out, and the results published in the Memoirs of the Geological Survey of Scotland ; the Geology of East Fife ; and Central and Western Fife and Kinrossshire.

The Hurlet Limestone is taken as the base of the Carboniferous Limestone Series, and its fauna is certainly that of the Upper *Dibunophyllum* zone. Consequently some portion of the Calciferous Sandstone Series must be of Lower *Dibunophyllum* age, and this bears out the contentions of the late J. G. Goodchild, that a good deal of this Calciferous Sandstone Series was the homotaxial equivalent of the Carboniferous Limestone further South.

On consulting the memoirs mentioned above, it will be noted that the Calciferous Sandstone is much more fossiliferous in the East of Fife than in the West, and the marine character of the deposits more pronounced.

WEST OF SCOTLAND.

The Liddlesdale and Eskdale beds are interesting, and yield a lamellibranch fauna which I consider low. But further than this I am not prepared to dogmatise at present.

In the West of Scotland the succession is somewhat similar but the Calciferous Sandstone Series is much less obvious, its deposition having been interfered with by volcanic outbursts. No marine organisms have been found in them, the only finds that have been obtained are remains of plants, ostracods and fish.

The Lower Limestone Series is very rich in fossils, and especially so in Corals and Brachiopoda.

The fauna has been diligently collected over the whole area, by several geologists, and most groups have been submitted to specialists, and it may be said that the distribution of the Carboniferous fauna of the West of Scotland is well known. As in the East, there is a Lower Limestone Series separated from an Upper Limestone Series, by a coal and ironstone-bearing Group, and that the Lower Limestone Series is characterised by a fauna typical of the Upper *Dibunophyllum* zone.

The fauna, also, in a somewhat more limited extent, is found in the Upper Limestone Series. For example, the Lower Carboniferous fish fauna passes up into the Upper Limestone Series, and then comes the change, and the upper fish fauna is found in the Millstone Grits and Coal Measures.

The Cephalopod fauna of the Upper Limestone Series calls for special remark. In the list compiled for the handbook of the British Association for the Glasgow Meeting, Mr. J. Neilson records the presence at Gare of several Goniatites, which in the Midlands are associated only with the Pendleside Series, such as *Glyphioceras reticulatum*, *G. striatum*, *G. vesica* and from both Upper and Lower Limestone Series of *G. diadema* and *Dimorphoceus gilbertsoni* from shale over the Hosie Limestone at Thornton.

Productus giganteus and a large number of Brachiopoda pass up into the Upper Limestone Series, but corals are much less frequent.

The interesting Cephalopod, *Pleuronautilus nodosocarinatus* occurs in the Upper Limestone Series. This is a rare fossil, and has a limited range in the Midlands, at the upper part of the Pendleside Series and Millstone Grit It has also been found in the Yoredale series of Swaledale.

Some 680 hundred feet of Grits, Sandstones, Fireclays with their coals, ironstones, and limestones, intervene between the Castle Cary, on the uppermost limestone of the Upper

Limestone Series, and the base of the Coal Measures, except in Ayrshire, where the Coal Measures rest on the Carboniferous Limestone. There is evidence elsewhere of volcanic activity at this horizon. It is in this Millstone Grit Series that the great change takes place from the Lower to the Upper Carboniferous flora, and about this horizon has recently been found, by Mr. D. Tait, of the Geological Survey, an interesting lamellibranch fauna, which I have described in the 'Transactions of the Royal Society, Edinburgh.' * The important fact revealed by this fauna is its relation to the fauna of the Coal Measures of Nebrasca, U.S.A., and till this discovery, most of the specimens had not been previously recognised in Western Europe. This fauna has been traced through several counties in Scotland. Since publication, one or two species have occurred in the millstone grits of the Midlands.

ISLE OF MAN.

I have shewn that the Carboniferous successsion in the Isle of Man † is to be referred to a few hundred feet of the Upper *Dibunophyllum* zone, and the base of the Pendleside Series. The sequence is very similar to that which obtains in the Midlands. The Poolvash Limestones and the black limestones of Scarlet, and the black marble quarry and their faunas can be well matched by examples from Derbyshire, Staffordshire and Yorkshire.

IRELAND.

Very excellent work has been done by Drs. Matley and Vaughan on the Carboniferous Series exposed from Rush to Loughshinny. Their latest views are that the whole Series represent *Dibunophyllum* beds, *Cyathaxonia*, and the Pendleside Series as high up as the horizon of *Glyphioceras spirale.* ‡ The palæontological reasons for this view are given at length; but in addition, the thicknesses of the Series, 1110 feet, strongly favours the correctness of this interpretation.

No work on definite zonal lines has been carried out in the south-west of Ireland, but certain facts are known. *Prolecanites compressus*, the fossil which characterises the uppermost beds of the *Cyathaxonia* beds and the lowest bed of the Pendleside Series, is found high up in a pure limestone, with a Visean fauna at Little Island, Co. Cork. In Calcareous shales at Old Head of Kinsale, *Posidonomya becheri* occurs in abundance.

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* Vol. XLVI., Part II., 15.

† 'Trans. Yorkshire Geol. Soc.', Vol. XXI., pt. 2, pp. 157-154.

‡ Q. J. Geol. Soc., Vol. XLIV., p. 434.

Similarly all through the West of Ireland, limestones with a high Visean fauna are succeeded by beds with a typical Pendleside fauna. Good sequences are to be seen at Foynes Island, Lisdoonvarna, Cliffs of Moher, and in the neighbourhood of Ennis.*

In the district of the Burren, in the North of Co. Clare, the whole of the Carboniferous Limestone Series is exposed in unbroken succession, and here it will be no very difficult task to make out the zonal horizons, though quarries are few, and the weathered surfaces will largely have to be relied upon to furnish the fossils. I believe the district is already under examination at the hands of competent geologists.

Probably in Tyrone and at Cultra, Co. Down, beds very low down in the Carboniferous Series occur, charactersed by *Modiola Macadamii,* but these areas require reinvestigating with our present knowledge of the distribution of Carboniferous Corals.

THE CULM.

In North Devonshire occur a Series of Carboniferous beds, known as the Culm. The district has been mapped and described by Mr. Ussher. Mr. Newell Arber has published papers dealing with portions of the Series from a standpoint of the flora and fauna respectively, and Messrs. J. G. Hamling and Inkerman Rogers have collected most carefully from the various horizons exposed.

Apparently resting on Upper Devonian rocks from which specimens have lately been obtained by Mr. Hamling, doubtfully referred to *Clymenia,* are a series of Cherty beds and Radiolarian Limestones, known locally as the Codden Hill beds. These contain the following fauna :—

TRILOBITES.

Phillipsia leei.
,, *minor.*
,, *cliffordi.*
,, *polleni.*

Griffithides acanthiceps.
,, *longispinus.*
Proetus Sp.

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* Hind., 'Proc. Roy. Inst. Acad.', Vol. XXV., Sept. 13, No. 4.

CORALS.

Palæacis humilis.
Zaphrentis cf. *Z. enniskilleni.*
Pleurodictyum decheanum.

CEPHALOPODA.

Prolecanites compressus.
,, *mixolobus.*
Nomismoceras spirorbis.
Pericyclus sp.

LAMELLIBRANCHIATA.

Chænocardiola footii.

BRACHIOPODA.

Chonetes cf. *laguessiana.*
Productus plicatus Sarres.

and many Radiolarians.

These beds are succeeded by black shales and limestones at Venn, which are crammed with *Posidonomya becheri.* The fauna they contain is sparse in species, and is as follows :—

Posidonomya becheri.
Pseudamusium fibrillosum.
Glyphioceras spirale (upper part)
,, *crenistria.*
Glyphioceras striatum.
,, *sphæricum.*
Orthoceras cylindraceum.

and plant remains.

These limestones are succeeded by the Middle Culm Grits, which contain plant remains. Above them comes a most interesting series of beds, best seen on the shore at Instow and near Clovelly, which contain concretions which yield the following fauna :—

Pterinopecten papyraceus.
Posidoniella lævis.
Gastrioceras listeri.
,, *carbonarium.*
Dimorphoceras gilbertsoni.
Orthoceras sp.
Cœlacanthus elegans.
Elonichthys aitkeni.

A fauna with the distinct facies of the Lower Coal Measures of Lancashire: and above this are the beds known as Upper Culm, which contain a typical Coal Measure Flora and Fauna *Carbonicola acuta* and *C. aquilina.*

The fauna here demonstrates a succession beginning with the Codden Hill beds, with zone fossils indicating these to be the homotaxial equivalent of the Pendleside Series of the Midlands, and passing up into Coal Measures, where, unfortunately, coals are conspicuously absent, and only represented by the beds of Culm, which were once worked for painters material.

In the South of Devonshire, and passing West from Exeter to Cornwall, that portion of the Culm Series characterised by *Glyphioceras spirale* is present. The Codden Hill or *Prolecanites compressus* beds appear to be present, and to be cherty in character, and are characterised by the presence of *Glyphioceras* *sphæricum* and *Posidonomya becheri.** I have seen the following species from Doddiscombleigh :—

Glyphioceras reticulatum.
Stroboceras sulcatum.
Seminula ambigua.
A Rhynchonellid.
Posidonomya becheri.

Mr. Ussher states † :—'As regards the relative position of the Codden Hill beds and *Posidonomya* Limestones and Shales, 'wherever these two types are recognisable on the North or South Crop, the Limestone Series is invariably the uppermost.' *Glyphioceras spirale* is a common fossil in the upper beds of the Lower Culm (*Posidonomya* beds) at Bampton, Waddon-Barton and elsewhere, both in the Northern and Southern crops.

SOUTH WALES.

At Bishopton in the Gower peninsula is a most typical sequence—the *Dibunophyllum* beds of the phases D2 and D3, the latter being represented by the dark limestones and shales of Oystermouth Castle. On these rest the Bishopton beds, consisting of a Series of cherty beds passing up into Black Shales with *Posidoniella laevis* and *Glyphioceras bilingue.* I think it probable that the cherts may represent in part the Codden Hill beds, but there seems to be a gap of the higher Series from the zones *Posidonomya becheri* to the incoming of the *Glyphioceras bilingue* beds, probably not any very great thickness of beds, but the zones here afford evidence of a local unconformity. Mr. I. Rogers has discovered *Glyphioceras reticulatum* in the Culm, near Barnstaple, so that the following life zones all occur in the Culm of Devonshire :—

Gastrioceras listeri.
Glyphioceras reticulatum.
Glyphioceras spirale.
Posidonomya becheri.
Prolecanites compressus.

And there can be little doubt that the Culm of the South-west, and the Pendleside Series of Co. Clare and the Midlands are homotaxial equivalents. This view is amply borne out on examining the Carboniferous succession in Belgium and Germany, where the Namurien and Culm are characterised by a fauna and flora identical with that of the Pendleside Series.

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* Mem. Geol. Sur. England and Wales; 'The Geology of Country round Exeter,' p. 9.

† The Geology of the Quantock Hills, and of Taunton and Bridgewater, p. 25.

(*To be continued*).

THRUSH STONES AND *HELIX NEMORALIS* L.

E. ADRIAN WOODRUFFE-PEACOCK, F.L.S., F.G.S.

THRUSH stones have interested me from my childhood onward, and I have collected tens of thousands of broken shells from them at various times. Sometimes thousands of shells may be found at a single anvil, on peat, fresh-water or estuarine alluvium, for stones or bricks are rare on such soils. They have always to be carried to the spots where the birds find them by man. When they are most pressed for animal food in severe winters or dry springs, the thrushes are not backward in finding fair substitutes for hard stones for anvils. The becks of the incline towards the great fenland, and of our smaller valleys, freeze, thaw partly, break up into floes, jam, and freeze again, presenting irregularities of surface, which the birds are quick enough to turn to good use. A stone standing slightly above the road or footpath level, the lowest bars of gates, the sharp points of low-set barbed-wire, or even 'the stubs' in a laid fence are not forgotten when other means fail them.

The whole subject is interesting, but does not give any approximate scientific results, until a fairly simple and ready field-method of recording the relationship of the banding to the interspacing on the shells is brought into use. When an elastic formula is found, the *nexus* between the shells of a given spot, their environment, and the thrushes is partly disclosed, and becomes explicable. Any method of recording to be of true use must be sufficiently simple to be applied, not only to specimens in collections, but at once in the field to the living molluscs. If it is too complicated, the relationship between the supply of shells on a given spot and those that are badly protected for want of banding, or by limited banding, and so are easily discovered by the birds, cannot be worked out.

When a long series of *H. nemoralis* is brought together from one place and is examined critically, it will be discovered that there is a common relationship and law of banding and interspacing prevalent among these local specimens. It has also a distinct relationship to their former environment. For instance, the form 12045 of the old notation, may be met with for 200 yards on *one* side of a stream and then be absent for miles, till it is picked up again, and is discovered to have a similar range on the bank of another stream. Personally, I have never taken this form anywhere except by flowing water.

Again, when the forms of banding of various soils and localities are brought together and are compared, the general banding law of the species is clearly seen. For *H. nemoralis*, it is most usefully stated in a formula, as $1_1 2_2 3_4 4_2 5$, which notes both the banding and inter-spacing widths. In these figures, reading from left to right, the first, third, fifth, seventh and ninth indicate the bands, and their general normal width; while the second, fourth, sixth, and eighth figures indicate the inter-spaces and their general normal width. In other words, the space between the upper side of the first band, and the lower side of the fifth band is divided into 24 imaginary band-spaces of equal width. As 24 is a number that can be divided by many other numbers without leaving a fraction, no other number about its size could be found equally useful. Even when the shells are not typical, such as the varieties *major* (Fér.), *minor* (Mog.), *compressa* (Terver.), or *conica* (Pascal), the formula applies.

In practical band and interspace recording in the field and study, I find it impossible to take off the banding formula of a shell in one long line as it is printed here. I used to write the typical formula down with the bands at wide distances, and below an imaginary line, the interspaces between them. Then I took the shell which I was about to record, and studied it to see which had the greater width, the fifth band or third interspace, and from this drew a criterion for the data of the shell; writing its formula in the *same way* below that of the typical shell formula. I know it so well now, I have no occasion to write the type formula; but that of the shell I still write in the same way, and strongly advise all analysts to do so. The eye is much helped by two lines of figures—one for the five bands, and one for the four interspaces, though they cannot be printed in that way conveniently. In reading off the printed formulæ, too, much assistance is gained by noting the central figure specially, which is always the third band record for every shell.

Specimens that are accurately represented by the type or any other *simple* formula are comparatively rare. So a practical method has to be discovered to show at a glance that the recorded bands and interspaces are wider or narrower than the width of the one twenty-fourth of the whole banding area.

This is quickly done by adding a colon after the figures that want less than one type-band increase, and a point after those that require diminishing to a like extent. By doubling or quadrupling the figures, a perfectly exact formula for any shell may be obtained. Difficulties of several kinds are met with by doing this, both in the field, and in clearness of recording, so in practice such formulæ are unworkable.

Three shells from a high hedge bank on sandy glacial gravel will illustrate at once this method and its flexibility. Here are their formulæ :—${}_{1}{}_{1}2_{2}2_{5}(425)$, $1_{1}.2_{1}.3{:}_{4}5_{1}6$, and $1{:}_{1}.2{:}_{2}.1{:}_{6}.5_{1}.5{:}$. There is nothing in anyway unusual about them. In the first shell the upper band was missing, and the lower ones confluent. Small figures always imply that the band and interspace, or the bands and interspaces, as the case may be, are absent, but that the space covered by them may be thus approximately accounted for. In the second shell, as their formula records them, the two first interspaces are too large, and the third band too small. The third shell is a more difficult task to take off correctly ; the fourth band alone is typical, all the other bands and interspaces require diacritical marks of increase or decrease. Along with these specimens two other shells were brought home from the Oxford clay of a dyke side. A *libellula* (Risso) + *conica* (Pascal) which read $1.{}_{2}1.{}_{2}2{:}_{5}2{:}_{4}.5$; and a *rubella* (Moq.) + *compressa* (Terver.) which read $1_{1}2_{2}2_{5}4_{2}5$, *i.e.*, with a simple band formula.

With this fairly expeditious method—when it is fully mastered—the bands and interspaces of *H. nemoralis* from varying localities and soils can be formulated sufficiently accurately for practical scientific results. The law of their relationship to their environment, and of the frequency of the destruction of all forms can be worked out. Still more important, the evolutionary law 'of the correlation of parts or characters' can be discovered so far as the bands and interspaces are influenced by it. The sheets I use for recording purposes are three inches wide by three and three-quarters long. I make the most exact notes of locality, soil, water, etc., for everything seems to influence the banding and interspacing, *i.e.*, the destruction of this species by thrushes. I keep the notes under soils, arranged in the order of their colour in the first place, then their varieties of form, and finally by the number of bands, ignoring the interspaces.

The commonest shell found at thrush stones is *libellula*

(Risso) unbanded. This is followed closely by three others in order :—112234425 to 112153425. Then come the specimens more ‘ lightly ’ banded on the upper side. The confluent type (112234425) is a fairly common shell at anvils on fresh-water alluvium, but the other form of it, where the bands show as deep black on a dark brown ground is rare. It is apparently the best protected form we have, for where it abounds it is not frequently taken. Confluent mouthed shells are more fully protected than plain banded ones. Soils and localities vary greatly in banding and interspacing formulæ ; and yet there is a strong family likeness in shells from one spot as we should naturally expect. So much is this the case that with sufficient notes on local shells, and a well-arranged register, I believe it would be quite possible to say from what soil, if the register were kept under localities, I could almost say from what spot, a given box, with a sufficient number of specimens, had been taken.

The following notes may be found useful. One method of reading off and recording the banding and interspacing must be followed. Turn the shell bottom upwards, in the dextral type with the mouth to the left hand. Draw an imaginary line from the point where the lip joins the body whorl, through the umbilicus round the shell, and read the banding and interspacing off along this line.

In every shell practically, unless some abnormality is found, the third band is always the longest, or approaches nearest to the lip. When the other four bands are absent, and the third band is abnormally developed, there is generally a point extending beyond the average length of this wide band toward the lip, approximately three twenty-fourths of the entire band space wide, indicating the position of the original third type band. Here is an instance. A ‘ dead ’ specimen of *rubella* (Moq.) 112162425, from road hedge side of pasture on sandy glacial gravel. Three interspace band widths beyond the normal had been covered, one above and two below, as the longer extending original third band indicated. On average shells, on the soils I have worked, the bands come in order of length towards the lip as follows :—34215. Exceptionally we find 32145 ; more rarely still some other order. The third band too, usually turns slightly down at the lip. When the two lower bands are confluent, there is generally a slight tendency to bend upwards, just before finishing, though the lip ending itself is generally in the normal line.

(*To be continued*).

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

In recent years there has unquestionably been a great improvement in the character and contents of the publications of the various volumes issued by the different scientific societies in the provinces. There is a general improvement in the editing, greater care is being taken with regard to dating, etc., and what is of more importance, each society is more and more realizing the advantage of confining the scope of its papers to its own area. So long as this is borne in mind by the local societies, the disadvantages of so many publications will disappear. It is also gratifying to find that members of many of the societies are taking up hitherto neglected branches of study, *e.g.*, arachnida, fungi, etc., with good result.

Journal of the Derbyshire Archæological and Natural History Society, Vol. XXXI., 1909. 243 pp. + xviii pp.

Like its immediate predecessors, this volume reflects the greatest credit upon its editor, Mr. C. E. B. Bowles. It is a substantial production, devoid of padding, and whilst it contains many pages outside the scope of our journal, it also includes several valuable papers worthy of the attention of our readers. Mr. T. Gibbs continues his 'First List of Derbyshire Agarics'—a work much more valuable than the word 'list' would infer. Messrs. W. Storrs Fox and R. A. Smith give an excellent illustrated account of the Excavations and the Finds in the Harborough Cave, near Brassington; the Rev. F. C. R. Jourdain writes a 'Zoological Record for Derbyshire, 1908,' and the editor writes on 'Coal Raising in the Seventeenth Century.' Amongst the authors of the numerous archæological papers are some of our leading antiquaries.

Transactions of the Vale of Derwent Naturalists' Field Club. New Series. Vol. I., part 1, 1908. Rowlands Gill. 71 pp., 1/-.

This little volume is an indication that our friends in the Vale of Derwent are working on the right lines. In his presidential address, Mr. H. F. Bulman refers to neglected branches of study; there is a good record of Field Rambles by different members; Mr. R. S. Bagnall writes on 'Strangers Zoological' [chiefly Coleoptera]; 'The Bristle-tails (*Thysanura*) of the Derwent Valley' [with list]; Mr. A. R. Jackson gives 'A note on some rare Spiders from the Derwent Valley'; Messrs. Carleton Rea and M. C. Potter write on the Fungi of Gibside, with list; Mr. R. Adamson enumerates 'Our Local Orchids'; Mr. J. W. Fawcet gives a brief History of Chopwell; the Editor, Mr. C. L. Bagnall, contributes 'A Brief History of Winlation'; and Mr. H. F. Bulman gives some Meteorological Notes.

The Recorders' Report for 1908 of the Bradford Natural History and Microscopical Society (20 pp.) in an inexpensive manner provides a useful record of a year's work in the Bradford district. In addition to the usual interesting notes on Birds, etc., we are glad to see lists of Hymenoptera, Diptera, Isopods, Arachnida, etc. We notice the recorder for Vertebrate Zoology urges 'ye local ornithologists' to 'wake up,' though there is not much evidence of their being dormant. The contributors to this interesting report are Messrs. F. Jowett, M. Malone, J. Beanland, F. Rhodes, J. W. Carter, R. Butterfield, J. H. Ashworth, W. P. Winter, H. B. Booth and J. W. Tindle.

The Proceedings of the Liverpool Naturalists' Field Club for 1908 are principally occupied with an account of the Club's Field Meetings during 1908 (chiefly botanical), but also contain the annual report, list of members, prize-winners, etc. The club has 166 members.

The Transactions of the Leeds Geological Association, Part XIV. (1905-8, published 1909, 71 pp. Leeds, 2/6) clearly indicate that the Leeds Geological Society at the present time is in a very flourishing condition. The membership is 112, 'a net increase of 27 over the previous session,' and both indoor and out-door meetings have been well attended. The present part of Transactions contains a good account of the Association's

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work during the past three sessions, with abstracts of papers read, etc. Several of these have been printed to greater length elsewhere ; some are now published for the first time, but all alike will be of interest to the members of the Leeds Society. Following these abstracts are usually suitable 'references,' though one or two of these (*e.g.*, 'A Strachan, Q.J.G.S.' ; 'Nordenskiold.—'Geol. Mag.', and 'Gregory—"Nature"') seem rather vague. We cannot enumerate all the interesting notes here, but we were particularly glad to find a good summary of Prof. Kendall's 'Geological History of the North Sea Basin,' 'The Clevelands and North-East Yorkshire—The Influence of Soils on Vegetation,' and 'A Description of Six Sections in the Lower Coal Measures of Leeds,' by B. Holgate. This last is illustrated by six excellent plates from photographs by the President, Mr. F. W. Branson, who has also paid for the plates. There is an excellent record of the work accomplished on the Association's Excursions, which is not (though should be) signed ; presumably it is the work of the Hon. Editor and Secretary, Mr. E. Hawkesworth. Another welcome feature is the 'Classified Index of the Transactions, Vols. I.—XIV.' This will be very useful, particularly to those who possess complete sets of the Transactions.

We don't know that anyone will be able to find much fault with the **Proceedings of the Yorkshire Geological Society for 1908.** It is a more than usually substantial volume ; is exceptionally well illustrated ; the date of publication is printed on the wrapper ; and the dates the various papers were read and MSS. received, are given at the head of each. Prof. Kendal gives suitable obituary notices of the late H. Clifton Sorby and Joseph Lomas, the former of which is illustrated by photos and photomicrographs of Sorby's first slides ; two of these we are kindly permitted to reproduce. Prof. McKenny Hughes contributes the sixth instalment of his paper on 'Ingleborough' ; Mr. H. Culpin follows with a paper on 'The Fossils in the Yorkshire Coal Measures above the Barnsley Seam' ; some of his new finds being described by Dr. Wheelton Hind. One is called *Aviculopecten culpini*, in honour of its discoverer. Other papers bearing upon Carboniferous Geology are contributed by Messrs. H. St. John Durnford, A. Wilmore, A. R. Dwerryhouse, Cosmo Johns and Walter Rowley. Mr. F. Elgee writes on 'The Glaciation of North Cleveland,' and Mr. A. Gilligan on 'Some Effects of the Storm of June 3rd, 1908.' The only thing we cannot quite understand in the whole volume is how

① Wilkinson's ½ in bar as
dressed on hand stake of ...
This is the first good object
I made.
H.C.S. 1862

the very third-rate block on plate XLVI., with its extraordinary description, managed to squeeze its way in between the very fine illustration of Corals, by Dr. Dwerryhouse, without being chipped by the Editor's geological hammer.

The Fifty-sixth **Annual Report and Transactions of the Nottingham Naturalists' Society** for 1907-8, was issued on February 19th, 1909. It contains a well-illustrated presidential address on 'Adaptation,' by J. Golding. Prof. J. W. Carr records *Selinium Carvifolia* for the first time in Nottinghamshire, the plant being first discovered as British in 1880, at Broughton Wood, Lincs.; and there are two pages of short notes on Nottingham birds, mammals, flowering plants, hepaticæ and fungi. Some of the botanical records are new to the county.

No. 19 of the **Bradford Scientific Journal,** for January, 1909, has appeared, and besides containing the reports of the Bradford Natural History and Microscopical Society, referred to elsewhere, has a further instalment of Mr. S. Margerison's notes 'On the Vegetation of some Disused quarries,' an interesting 'Note on the Cockchafer,' by Mr. W. P. Winter, and an account of an 'Exploration' of Mounds near Cullingworth. From the description given we are inclined to agree with the opinions of 'several practical men' who have seen them and pronounce them to be quarries. The only mound that yielded any 'relics' contained pieces of a pipe stem, and we agree with Dr. Villey that from this evidence 'it is fairly clear that the work was not pre-historic.'

The Seventy-fifth Annual Report of Bootham School (York) Natural History Society (32 pp.), is an excellent record of an excellent year's work. In all branches (with the possible exception of geology), there seems to have been a steady desire for useful work, and the sectional reports are most encouraging. There are also accounts of the School's exhibit at the Franco-British Exhibition, and its Christmas Exhibition, both of which were highly successful. Instead of a list of rare eggs collected, we are glad to notice the more innocent 'oology has also prospered!' For some unrecorded crime we notice that one youth is advised to '*stick to insects!*'

The Eighty-sixth Annual Report of the Whitby Literary and Philosophical Society records a year of steady progress. More footprints have been secured by Mr. Brodrick, who read 'a most satisfactory paper on the whole subject before the British Association.' Mr. Buckman is examining the Liassic fossils in the collection, and doubtless good will result. A long-tailed duck, 'the first of its species ever taken in Whitby,' was secured in November last, and is now in the Museum. The Report also contains the Meteorological Records for 1908, and a list of additions to the library, 1899-1909.

The Scarborough Philosophical and Archæological Society has issued its Annual Report for 1908, and it includes the report of the **Scarborough Field Naturalists' Society.** A report of a useful paper on 'Pre-historic Man in the Scarborough District,' by Mr. Rowntree, is included, and amongst the additions to the Museum we notice a timepiece mounted in carved jet, which has apparently been purchased for £5 5s. 0d. The Society has a balance in hand of £245. We are glad to see that Mr. M. C. Peck is now the President. The Recorders of the Naturalists' Society print useful accounts of their work during the year. Would not the list of local non-marine mollusca have been better printed locally, instead of being sent elsewhere, where 'it is hoped they will be able to publish it during the coming year?' We are glad to notice that a careful eye is kept upon the local rare plants. A Power Cod, 7½ inches in length (rather longer than the average), was caught from the East Pier, and is believed to be the first record for the county.

RECENTLY DISCOVERED FUNGI IN YORKSHIRE.

C. CROSSLAND, F.L.S.

THE following is the third supplementary list of Fungi discovered in Yorkshire since the issue of the 'Yorkshire Fungus Flora.' It comprises one species new to science, six new to Britain, and nearly fifty species and two var. new to Yorkshire. These bring the total of known Yorkshire Fungi, as we understand them at present, to 2763. There are two confirmations of hitherto solitary records, and several newly-discovered (in Yorkshire) hosts attacked by parasitic fungi. Short descriptions of each of the six new British species are added. The numbers given under each, to follow or precede, are those of the species, as arranged in the 'Yorkshire Fungus Flora.' The reference (* 'Nat.' . . .) = The species was seen at a Yorkshire Naturalists' Union Excursion, and the record published in the 'Naturalist' on the date given. 'F.F., '08 = Mulgrave Fungus Foray.

NEW SPECIES.

COPRINUS CORDISPORUS Gibbs.

For original description and remarks, see 'Nat.', Mar. '08, p. 100.

S.W.—Sheffield, 1904; Farnley Tyas F.F., 1906.

Mid. W.—Buckden F.F., 1907. N.E. Mulgrave Woods. (F.F. '08, 'Nat.', Jan. '09, p. 25).

Also Wirksworth, Derbyshire. On dung of horse, sheep, and rabbit. [To precede No. 742*].

NEW TO BRITAIN.

BOVISTELLA PALUDOSA Lév.

N.E.—Among Sphagnum on the moors nea Osmotherley. Y.N.U. Exc., August 1st-3rd, '08.

'Only one previous gathering of this species is known: that made by Leveille at Malesherbes, France, 1845; of this gathering, two specimens are in the Museum at Paris, and one at Kew.' (*' Nat.', Dec. '08, p. 457).

'*Peridium reddish brown, subglobose, contracted to a short stem-like base, thin, becoming smooth when old. Cortex minute,*

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* The number to follow or precede refers to the species in the 'Yorks. Fungus Flora,'

sub-furfuraceous. Sterile base scanty. Gleba dark olive. Capillitium of separate branched threads, with the main stock thick, 8-10 μ., and deeply coloured. Spores globose, smooth, 4-5 μ., with slender pedicels, 10-12 μ. long.' (C. G. Lloyd, 'Mycological Notes,' Cincinnati, Aug. 1906, p. 280. Pl. 87, fig. 8).

[To follow No. 29].

TRICHOLOMA CARNEOLUM Fr.

N.E.—Mulgrave Woods. Among short grass. (F.F., '08, 'Nat.', Jan. '09, p. 24).

'*Small, pileus plano-depressed, obtuse, even, flesh-red, then pale; gills closely crowded, very broad behind, shining white,*' (' Mass. Eur. Agaricaceæ,' p. 24). [To follow No. 118].

NOLANEA MINUTA Karst.

N.E.—Arncliffe, near Osmotherley. On bank of peaty ditch. (*' Nat.', Nov. '08, p. 410).

'*Pileus convex, sometimes umbilicate, striate up to the umbilicus, glabrous, pallid fuscous, paler when dry, and shining; gills adnate, pallid; stem pallid fuscous, glabrous; spores rough, 7-9 μ.*' (' Mass. Eur. Agar.', p. 131).

[To come last in the genus in 'Y.F.Flo.' p. 69].

PHOLIOTA SORORIA Karst.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25).

'*Pileus convex, expanded, slightly striate, squamulose, tawny-cinnamon; gills sinuato-adnate, crowded; stem equal, wavy, colour of pileus then paler, variegated with white squamules, apex scurfy; spores* 6-7×3-4 *μ.*' (' Mass. Eur. Agar.', p. 146). [To follow No. 412].

INOCYBE COMMIXTA Bres.

N.E.—Mulgrave Woods (F.F., '08, 'Nat.', Jan. '09, p. 25).

'*Pileus conico-campanulate, expanded, umbilicate, shining white or tinged grey, fibrillosely silky, edge often split, dry; gills closely crowded, free, white then greyish cinnamon; stem solid, white, equal, apex scurfy, base minutely turbinately bulbous; spores angular,* 10×7 *μ.* Closely resembling *I. geophylla*, differing in base of stem and angular spores.' (' Mass. Eur. Agar.', p. 155). [To follow No. 447].

TAPESIA RETINCOLA (Rabh.) Karst. [*Trichobelonium retincolum* (Rabh. 'Krypt Flo.', Disc., p. 592); *Peziza retincola* (Rabh., 'Fungi Eur.', 225); *Belonium retincolum* (' Sacc. Syl. Disc.', p. 495); *Helotium retincolum* (' Rabh., Kalchbr. Szep.',

p. 238, p. 2, f. 1); *Mollisia retincola* (' Karst Myc. Fenn. I.', p. 209).

S.E.—Mere side, Hornsea. On dead stems of *Phragmites communis* (*' Nat.', Aug. '08, pp. 309-10).

Description taken from the Hornsea specimens :—

Ascophores gregarious or scattered, seated on a dark brown subiculum, attached to the matrix by a central point, closed and subglobose at first, then expanded till plane or only slightly convex, with raised margin, disc pale yellow or whitish, 1.5—3 *mm. across, margin lobed in well-grown specimens, exterior dark grey-brown, margin pale ; excipulum of radially densely intermingled, hyaline, hyphæ* 2—2.5 *μ thick, cortical cells brown, globose,* 11-14 *μ diam, running out to elongated, hyaline, parallel cells at the margin ; Asci narrowly clavate, apex narrowed to an obtuse point,* 100-120 × 7 *μ (broadest part) ; Spores* 8, *hyaline, sub-biseriate, straight or curved (mostly curved), linear fusiform, ends rounded,* 20-23 × 3 *μ, irregularly guttulate, oftenest with* 3-4 *globules at each end, centre indistinctly minutely granular, no trace of septa ; paraphyses sublinear, slightly widening upwards,* 3-4 *μ, thick, contents granular in some, homogeneous and glistening in others, difficult to separate from the asci.*

Hyphæ of subiculum dark brown, flexuous, 4.5-5 *μ thick.*

NEW TO YORKSHIRE.

Geaster mammosus Chev.

N.W.—A fine collection of this ' earth star ' was found under a hedge, pasture side, near the village of Witton, Wensleydale, March 1908, by W. A. Thwaites, Masham. [To follow No. 12].

Lepiota glioderma Gill.

N.E.—Mulgrave Woods. On the ground among grass. (F.F., '08, ' Nat.', Jan. '09, p. 24). [To precede No. 80].

Tricholoma squarrulosum Bres.

N.E.—Mulgrave Woods. On the ground. (F.F., '08, 'Nat.', Jan. '09, p. 24). [To follow No. 107].

T. cerinum Quel.

N.E.—Mulgrave Woods, (F.F., '08, ' Nat.', Jan. '09, p. 24). [To follow No. 115].

Clitocybe comitalis Gill.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 24). [To follow No. 139].

C. AMPLA (Pers.).

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25) [To follow No. 149].

C. EXPALLENS (Pers.) Quel.

S.W.—Battyeford, near Mirfield, on the ground in a pasture, Oct. '08. F. Buckley. Com. A. Clarke.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25). [To follow No. 164].

C. STEVENSONI Sacc.

S.W.—Firthhouse, Stainland, nr. Halifax. Among grass on embankment, Nov. 1908. A. Clarke. [To follow No. 189].

C. EXSCULPTA Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. 09, p. 25). [To come between Nos. 199-200].

VOLVARIA MEDIA Gill.

N.E.—Mount Grace Priory, on gravelly path, Aug. '08. (*'Nat.', Nov. '08, p. 410). [To precede No. 320].

PHOLIOTA TERRIGENA Fr. (*Includ. P. Cookei Fr.*).

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25). [To precede No. 396].

INOCYBE HIRSUTA Lasch.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan., '09, p. 25). [To follow No. 419].

I. HÆMACTA Berk & Cke.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25), [To follow No. 423].

CORT (Phleg.) VARIICOLOR Fr.

N.E.—Mulgrave Woods (F.F., '08, 'Nat.', Jan. '09, p. 25). [To follow No. 540].

CORT (Tela.) MACROPUS Fr.

N.E.—Mulgrave Woods, (F.F., '08, 'Nat.', Jan. '09. p. 25). [To precede 587].

CORT (Tela.) BOVINUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 25). [To precede No. 598].

PSILOCYBE AGRARIA Karst.

S.E.—Firby Wood, Kirkham Abbey, on the ground near rotting stump. York and District F.N.C. (' Nat.', Oct. '08, p. 386. [To follow No. 687].

PAXILLUS EXTENUATUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 25). [To follow No. 757].

HYGROPHORUS MUCRONELLUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To follow No. 792].

RUSSULA ATROPURPUREA Kromb.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To follow No. 871].

R. SEROTINA Quel.

S.E.—Firby Wood, Kirkham Abbey. York and District F.N.S. (' Nat.', Oct. '08, p. 386). [To follow No. 875].

R. CONSOBRINA var. intermedia Cke.

Mid. W.—Clapham. (Exc., Sept. 5-7, '08).

CANTHARELLUS GLAUCUS Fr.

S.W.—Slaithwaite, Among short grass on bowling green, Sep. 1908. D. Haigh and E. J. Walker. Com. A. Clark. [To follow No. 911].

MARASMIUS WYNNEI B. and Br.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To follow No. 922].

BOLETUS CHRYSENTERON var. VERSICOLOR Rost.

Mid. W.—Stainer Wood, near Selby, Aug. '08, W. N. Cheesman. Some authorities consider this to be a distinct species.

POLYPORUS LACTEUS Fr.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To follow No. 1036].

HYDNUM SORDIDUM Weinm.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To precede No. 1117].

H. STIPATUM Fr.

Mid. W.—Near Selby, on rotting wood, Jan. 27th, '08. W. N. C. [To follow No. 1122].

HYMENOCHÆTE FULIGINOSA Lév.

Mid. W.—Stainer Wood, near Selby, on birch bark, Oct. 1908. W. N. Cheesman. [To follow No. 1173].

(*To be continued*).

NEW BOTANICAL BOOKS.

Stocks, by **R. P. Brotherston,** and **Lawns,** by **W. J. Stevens,** are two further well-illustrated penny pamphlets issued by the London Agricultural and Horticultural Association.

Asters, by **Walter Wright, F.R.H.S.** London: Agricultural and Horticultural Association. Price One Penny.

This is the eighteenth 'One and All' garden book, and ought to be as popular as any of its predecessors. The writer is well known and is esteemed not only for his practical knowledge, but for a fine literary style. The book is fully illustrated. A similarly illustrated pamphlet, dealing with **Tomatoes,** by **W. Iggulden,** has also recently been issued from the same house.

Synopsis of the British Basidiomycetes. A descriptive Catalogue of the Drawings and Specimens in the Department of Botany, British Museum, by **Worthington George Smith:** British Museum, London. 531 pp., 10/-.

A few years ago the British Museum acquired the MS. descriptions drawn up by Mr. Worthington G. Smith, when preparing the fine series of coloured drawings of British Fungi, exhibited in the Department of Botany. These descriptions were accompanied by line drawings, illustrating the characters of each genus. It was rightly considered by the Trustees that these descriptions and drawings, if put in convenient form, would prove a useful introduction to the study in the field of the larger fungi. This volume is the result; and from the care with which it has been prepared, its arrangement, the wealth of clear sketches, as well as its cheapness, there can be no doubt that it will at once take its place as a constant guide and companion to every mycologist. There is a useful glossary, and an exceptionally carefully compiled and complete Index. Amongst the 'recent additions' we notice the following Yorkshire records: *Tricholoma carneolum*, *Pholiota sororia* and *Inocybe commixta.*

Life Histories of Common Plants, by **F. Cavers, D.Sc., etc.** pp. XVI. and 363, with 123 figures. W. B. Clive. 1908, price 3/-.

In this book, Professor Cavers has brought together a large number of interesting and reliable lessons on our common flowering plants. The first chapter deals with the Bean plant in much detail. Chapters 2 to 6 are concerned with seeds and seedlings, nutrition, growth of shoot and root, buds, flowers, fruits and seeds. Then follow ten chapters dealing with the life histories of some three dozen common flowering plants. In four chapters are described the more familiar trees, the concluding chapter treats briefly on the ecology of plants. The book is intended primarily for young teachers studying botany for the certificate examination, and we know of no better book for this purpose. All the important facts are clearly brought out, and no opportunity is lost of encouraging students to make observations at first hand. The chapters on trees are more complete than in any similar book we have seen, and it does not err like some recent books in leaving so large a share of the facts to be discovered by the student, as to become discouraging. The index is much better than some in this series, and errors are few. On page 335, art. 194 should be 190, and coltsfoot rhizomes (p. 273) are misnamed 'runners.' In the chapter dealing with ecology, a paragraph might usefully have been added on the place of trees in vegetation. As it is, students will find here an excellent guide and introduction to their botanical studies.

Life Histories of Familiar Plants, by **John J. Ward.** Cassell & Co. pp. XX. and 204, with 86 plates; Price 6/-.

A mere glance at this book shews that the author has used his camera to good purpose, and furnished a series of very interesting and for the most part, useful photographs in illustration of his text. In all there are 121 figures, some from photo-micrographs. The book is intended for 'non-professional nature investigators who seek the why and wherefore of details of plant structure.' The intention is excellent, but the performance very disappointing. One looks for life histories, and finds, for the most part, scraps of information interwoven with very crude ideas on evolution. Frequent errors occur in elementary details, and little care is exercised as to choice of terms. He speaks of the sycamore fruit constantly as the seed,' and explains how the 'seeds' should have developed wings. etc. Of the root-cap he says, 'within this is the true growing tip of the root, but it is the sensitive root-cap which guides the root tip to suitable quarters.' According to the author, the thorns of the Gorse arise thus: 'higher up the stem the leaflets get thinner and sharper, gradually changing into thorns.' Plate XLVII. contains excellent figures of Cacti, but, instead of pointing out the importance of the radiating spines in functioning as a light screen, he says 'they obviously run no risk of getting their leaves scorched by the hot rays of the sun,' overlooking the advantage of protecting the green tissue of the stem. These are only a few of many similar statements the book contains, and we agree with the author when he says, on p. 95, 'It is true that the science of Botany may be pursued by different methods from those I have adopted in this chapter,' and we can only hope it will be.

The Heridity of Acquired Characters in Plants, by the **Rev. Prof. G. Henslow, M.A., F.L.S.** John Murray. pp. XII. and 107, with 24 illustrations. 1908, price 6/- net.

The author declares that the object of this book 'is to prove that Evolution—so far as plants are concerned—depends upon the inheritance of acquired characters,' in opposition to Wiesmann's view that such characters are not transmitted unless the influence of the environment reaches the reproductive cells. In this matter Prof. Henslow has set himself a very difficult task, and in reading carefully over his pages, we are by no means certain that his attempt has been successful. He declares with great emphasis that present-day ecologists are all at one in accepting the view he advocates, but he adduces very little evidence of this, and we look in vain for definite experimental proofs brought forward by the ecologists he claims as supporters. He says, 'Germany, France, Denmark, the United States, South Africa abound with ecologists . . . . but, as Darwin himself was the first to profound [sic] this view, I called it "The True Darwinism."' Many general observations have been made, and a certain amount of detailed work has been done on the effect of environment on plant form and structure, but examples are exceedingly rare where such modifications are shewn to give rise to new species. Such acquired variations usually persist only so long as the conditions of the environment which called them into being, persist; that is, they are continuous variations but that continuous variations are inherited has not been by any means generally proved, nor is it an easy task.

Another difficulty in dealing with continuous variations is to distinguish those which are genetic from those which are acquired, and in many of the illustrations given in this work, no attempt is made to deal with these distinctions. Cases like the water-buttercup furnish pretty good examples of the inheritance of acquired characters, but they are so rare that, in spite of the author's many assertions, we still await more such proofs before we can declare with confidence either that 'all structures arise by direct adaptation by response,' or that such acquired characters play an important part in the evolution of species. However, Prof. Henslow brings forward many facts which of themselves, are valuable and interesting and if the book induces workers, even ecologists, to pay attention to the matter and furnish a quality of evidence at all comparable to that of the Mendelians, it will have served a very useful purpose.

Messrs. Cassell & Co. are unquestionably doing excellent service by placing before the public popular botanical works at so very low a price. They are just issuing three excellent publications, all of which will doubtless find a ready sale amongst the increasing number of nature students.

Having regard to the excellence of the illustrations, and the nature of the letterpress, we can safely recommend them to our readers. The late **F. E. Hulme's** well-known **Familiar Wild Flowers** is being published in forty-five fortnightly parts, at 6d. each, and several coloured plates accompany each. By the same author, the firm have issued **Familiar Swiss Flowers,** first series, with twenty-four coloured plates, at 1/- net. It is uniform in size with Mr. Hulme's other work, and the illustrations are even better. On plate XVII. the Dark-winged Orchis is labelled 'Dusky Columbine,' and *vice versa*, but this will doubtless be corrected in a future edition. **Trees and their Life Histories,** by **Dr. P. Groom,** is also being issued in fortnightly parts, at 1/- each, and will be completed with No. 13. Dr. Groom's excellent and trustworthy text is illustrated by photographs by Henry Irving.

GEOLOGICAL PAPERS.

We have recently received a number of valuable geological pamphlets, which we have pleasure in bringing before the notice of our readers. **The Fluorspar Deposits of Derbyshire,** by Messrs. C. B. Wedd and G. C. Drabble ('Trans. Inst. Min. Engineers,' Vol. XXV.) deals exhaustively with the occurrence, composition, and commercial value of 'Blue John,' etc. It is accompanied by a sketch-map of the Carboniferous Limestone of Derbyshire, shewing Fluor-bearing Veins and Pipes. Mr. R. Bullen Newton sends two pamphlets. The first, **Fossil Pearl Growths** ('Proc. Malacological Soc.', Vol. VIII.) describes many occurrences of pearls in fossil shells from various strata, chiefly of Mesozoic age. They are recorded in *Volcella*, *Inoceramus*; *Perna*; and *Gryphæa*. Several excellent illustrations accompany the paper. The second paper, **Relics of Colouration in Fossil Shells** (loc. cit., Vol. VII.), deals with the traces of the original colouring to be found in fossil mollusca. The list given is a very extensive one, and includes examples from Cainozoic, Mesozoic and even Palæozoic strata. The plate accompanying this paper might almost be an illustration of recent species, so clearly are the markings shewn. From the same journal, Mr. A. J. Jukes-Browne reprints a useful paper on the **Genera of Veneridæ in Cretaceous and Older Tertary Deposits.** The author points out that the family doubtless originated during Jurassic times, and he makes the interesting suggestion that the *Veneridæ* possibly developed along two different lines of descent; the possibility of the latter mode of origin being suggested by the great difference which is observable among the Cretaceous representatives. Mr. Jukes-Browne holds that the characters of the hinge in these shells afford the best and most convenient means of distinguishing the generic groups from one another. The paper is illustrated by a plate shewing excellent drawings of the hinges of twelve Cretaceous and Eocene Venerids. Dr. F. A. Bather kindly sends three useful papers. The first entitled **'Visit to the Palæontological Exhibit in the Science Hall, Franco-British Exhibition'** ('Proc. Geol. Assn.,' Vol. XX., part 7), is a description of the various methods employed in the study of fossils; and deals with the subject under the heads of collecting, preparation and preservation, study, and presentation of results. Those who are under the impression that a palæontologist's outfit consists of a hammer, chisel and hatpin, will be severely 'disillusionised' on reading this paper. His second paper **The Preparation and Preservation of Fossils** ('Museums Journal'), deals more particularly with the question of freeing specimens from the matrix; whilst the third is on similar lines, and refers to **Nathorst's Methods of Studying Cutinised Portions of Fossil Plants** ('Geol. Mag.', Decade V., Vol. V.). The method of freeing fern spores from an apparently homogeneous mass of palæozoic rock, reads almost like a fairy-tale, and demonstrates that there are many more ways of unravelling the secrets locked up in the rocks than are dreamt of in most men's philosophy. From Mr. W. J. Lewis Abbot, F.G.S., we have received a reprint of his exceptionally complete and carefully considered account of **'The Pleistocene Vertebrates of South-east England.'** This contains particulars of no fewer than 127 species.

THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

Wm. WEST, F.L.S.,
AND
G. S. WEST, M.A., D.Sc., F.L.S.

(*Continued from page 141*).

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cocconema cymbiforme var. *parvum* (W. Sm.) Van Heurck.			×														
,, *gracile* (Rabenh.) G. S. West	×						×		×			×		×	×		
,, *lanceolatum* Ehrenb.				×													
,, *ventricosum* (Kütz.) G. S. West									×	×		×					
Amphora ovalis Kütz.																	×
Epithemia turgida (Ehrenb.) Kütz.									×			×					×
Nitzschia Palea (Kütz.) W. Sm.	×				×												×
,, *Sigma* (Kütz.) W. Sm.														×	×		
Surirella robusta Ehrenb.										×							
,, ,, var .*splendida* (Ehrenb.) Van Heurck.							×			×		×	×	×	×		×
,, *biseriata* Bréb.	×		×						×	×				×	×	×	×
,, *linearis* W. Sm.			×											×			
Myxophyceæ.																	
Anabæna flos-aquæ (Lyngb.) Bréb.												×	×				
,, *Lemmermannii* Richter													×				×
Lyngbya bipunctata Lemm.														×	×		
Oscillatoria Agardhii Gomont													×				×
,, *irrigua* Kütz.														×			
,, *rubescens* D.C.																	×
Oscillatoria tenuis Ag.									×				×	×			×
Merismopedia æruginea Bréb.														×	×		
., *glauca* (Ehrenb.) Näg.														×			
Gomphosphæria lacustris Chodat												×		×	×		
Cœlosphærium Kützingianum Näg.		×									×	×		×		×	×
Microcystis æruginosa Kütz.																	×
,, *incerta* Lemm.															×		
,, *pulverea* (Wood) Migula																	×
,, *stagnalis* Lemm.	×												×				
Chroococcus minimus (Keissler) Lemm.														×			
,, *turgidus* (Kütz.) Näg.														×			

SPECIES.	Cumberland.							Westmorland.									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
FLAGELLATA.																	
Synura uvella Ehrenb.	..	..	..	..	..	..	..	..	×	..	..	..	..	..	..	..	×
Mallomonas longiseta Lemm.	..	..	..	..	..	..	..	×	..	..	..	..	..	..	×	..	×
Dinobryon cylindricum Imhof.	×	×	..	..	..	×	..	..	..	×	..	..	..	×	×	×	×
,, ,, var. *divergens* (Imhof.) Lemm.	..	..	×	×	×	..	×	×	×	..	×	×	×	×	..	×	×
,, *elongatum* Imhof.	..	..	..	..	..	..	..	..	..	..	..	..	×				
,, ,, var. *undulatum* Lemm.	..	..	..	..	..	..	..	..	..	..	..	..	×				
PERIDINIEÆ.																	
Gymnodinium paradoxum Schilling	..	..	..	..	..	..	..	..	×	..	..	..	..	..	×		
Peridinium inconspicuum Lemm.	..	..	×	..	..	..	..	..	..	..	..	..	..	×	×		
,, *tabulatum* (Ehrenb.) Clap. & Lachm.	..	..	..	..	..	..	..	×	..	..	..	..	..	×	×		
,, *Willei* Huitfeldt-Kaas	..	×	×	×	×	×	×	×	..	×	..	..	×	×	×	×	×
Ceratium hirundinella O. F. Müller	..	..	×	×	×	×	..	×	×	..	×	×	×	..	..	×	×
,, *cornutum* (Ehrenb.) Clap. & Lachm.	..	..	..	..	..	..	..	×	..	..	..	×					

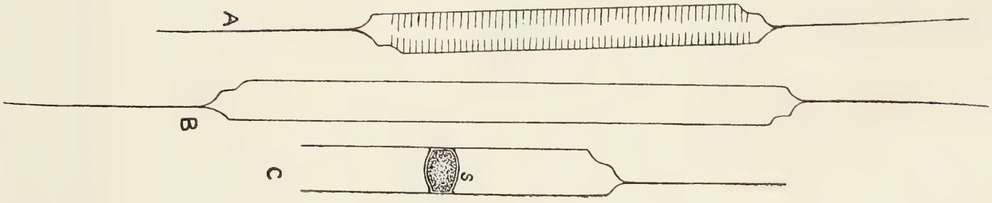

Fig. 2. AC.—*Rhizosol enia-morsa* W. & G. S. West, from the plankton of Thirlmere. × 430. C is a portion of a cell containing a resting spore (*s*).

III.—THE PERIODICITY OF THE PLANKTON OF WINDERMERE.

Of the periodical collections of plankton we have been receiving from three lakes of the English Lake District, only those from Windermere have hitherto extended over a sufficient length of time to enable us to draw up a report on the periodicity of the plankton-constituents. These collections commenced in September 1907, and were made at fairly regular monthly intervals until August 1908. We are indebted to Mr. Frank Holmes, of Bowness, for continuing to make the collections according to instructions, and also for recording the water-temperatures at the time of collection.

Monthly Statement of Plankton from Sept. 1907 to Aug. 1908.

September 1907.—Water-temperature 14.4°C. (=58° F.). Mixed Crustacea and Desmid plankton. The Crustacea consisted of *Bosmina longirostris, Daphnia longispina,* and others. The Desmids were very conspicuous, more particularly the following six species—*Cosmarium subtumidum* var. *Klebsii, Xanthidium subhastiferum* var. *Murrayi, Staurastrum curvatum, St. jaculiferum,* and *St. paradoxum.* The Diatoms were mostly *Tabellaria fenestrata* var. *asterionelloides,* which was present in quantity, and *Asterionella gracillima. Dinobryon cylindricum* var. *divergens* was in moderate quantity, and certainly more abundant than in any other month of the twelve during which collections were made. *Ceratium hirundinella* and *Peridinium Willei* are both general. Rotifers numerous. *Cœlosphærium Kützingianum* rather common.

October 1907.—Water-temperature 9°C. (=48°F.). Largely a Desmid plankton, the four most conspicuous species being *Xanthidium subhastiferum* var. *Murrayi, Staurastrum curvatum, St. cuspidatum* var. *maximum,* and *St. paradoxum. Cosmarium subtumidum* var. *Klebsii* has practically disappeared. Small colonies of *Sphærocystis Schroeteri* are frequent. *Ceratium hirundinella* is fairly general, but there is less *Cœlosphæium Kützingianum.* Rotifers numerous. Increase in quantity of *Asterionella gracillima.*

November 1907.—Water-temperature 7.2°C. (=45°F.). Gradually becoming a Diatom plankton. Great increase in the quantity of *Asterionella gracillima.* A number of littoral Diatoms washed into the plankton, mostly belonging to the *Naviculaceæ.* The three following Desmids were still conspicuously abundant:—*Xanthidium subhastiferum* var. *Murrayi*, *Staurastrum curvatum*, and *St. paradoxum*. The amount of *Cœlosphærium Kützingianum* has greatly diminished. Fewer specimens of *Ceratium hirundinella*, but an increasing amount of *Mallomonas longiseta*. Rotifers numerous.

December 1907.—Water-temperature 3.2°C. (=38°F.). A mixed plankton much less in general bulk than in the preceding months. *Asterionella gracillima* in great abundance, but *Tabellaria fenestrata* var. *asterionelloides* has almost disappeared. *Mallomonas longiseta* reaches its maximum abundance. The rest of the phytoplankton has much diminished, although several Desmids are present in small quantity. *Peridinium Willei* is exceedingly rare, and *Ceratium hirundinella* has completely vanished. Crustacea present in considerable numbers, but Rotifers are few.

January 1908.—Water temperature 1.1°C. (=34°F.). *Asterionella gracillima* still very abundant. Few specimens of *Mallomonas longiseta*. Several species of Desmids (of which *Staurastrum jaculiferum* is most noticeable), not uncommon. One specimen of *Pediastrum glanduliferum* was observed, doubtless washed into the plankton from the shores. Crustacea fairly common, but Rotifers scarce.

February 1908.—Water-temperature 0.2°C. (= 32.5°F.). Very little phytoplankton, but a fair number of Crustacea. *Asterionella gracillima* somewhat less abundant, but still numerous. *Melosira granulata* beginning to get conspicuous.

March 1908.—Water temperature 0.4°C. (=33°F.). Crustacea dominant, but the whole plankton of little bulk. *Melosira granulata* is more abundant, but the numbers of *Asterionella gracillima* have very greatly diminished. A few specimens of *Tabellaria fenestrata* var. *asterionelloides*, and also of *Mallomonas longiseta*, were observed.

April 1908.—Water-temperature 1.7°C. (=35°F.). *Melosira granulata* abundant and *Asterionella gracillima* fairly common. A number of littoral species of Diatoms washed into the plankton. Several species of *Staurastrum* represented by few specimens. Two spring forms—*Ulothrix zonata* and *Synura uvella*—were not uncommon.

May 1908.—Water-temperature 4.4°C. (=40°F.). An *Asterionella*-plankton with a fair quantity of *Melosira granulata*. *Rhizosolenia morsa* not uncommon, and a little *Tabellaria fenestrata* both in the typical chain disposition and in the star-disposition (var. *asterionelloides*). A few specimens of *Ceratium hirundinella* make their appearance.

June 1908.—Water-temperature 8.3°C. (=47°F.). A marked *Asterionella*-plankton, *A. gracillima* reaching a maximum greater than the Nov.-Jan. maximum. *Tabellaria fenestrata* var. *asterionelloides* fairly numerous, but *Melosira granulata* quite disappeared. A few Desmids have appeared, and also the first bits of *Anabæna Lemmermannii*. Plenty of Crustacea, but all of one species—*Bosmina longirostris*. Rotifers becoming evident.

July 1908.—Water-temperature 11.6°C (=53°F.). A Crustacean plankton, with a large amount of *Bosmina longirostris*, *Daphnia longispina*, and Copepods. A few Desmids are fairly evident, and also a thin species of *Spirogyra*. *Ceratium hirundinella* quite common, and a few individuals of *Cœlosphærium*. Masses of floating spores of *Anabæna Lemmermannii*. Rotifers increasing in numbers.

August 1908.—Water-temperature 12.7°C. (=55°F.). A Crustacean plankton, with a gradually improving phytoplankton. Desmids becoming numerous and *Ceratium hirundinella* plentiful. *Peridinium Willei* abundant. *Microcystis æruginosa* occurred in the plankton-collections for this month, but only a few specimens were seen.

GENERAL REMARKS UPON THE PERIODICITY.

The first publication dealing with the periodicity of British phytoplankton was by Fritsch, who recorded the results of a somewhat incomplete series of collections made in the river Thames.* The next publication was by Bachmann, who gave an account of periodical collections made by Father Cyrill in Loch Ness from July 1904 to May 1905.†

In Windermere, the dominant constituents of the phytoplankton are Chlorophyceæ and Diatoms, the Myxophyceæ never at any time being conspicuous. In all, 65 species have been observed, of which 30 (or 46.1 per cent.) are Chlorophyceæ, 23 (or 35.4 per cent.) Bacillarieæ, 7 (or 10.7 per cent.) Myxophycæ, 3 (or 4.7 per cent.) Flagellata, and 2 (or 3.1 per cent.) Peridinieæ.

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* F. E. Fritsch, 'Further Obs. on the Phytoplankton of the R. Thames,' Ann. Bot. XVII., Sept. 1903.

† Bachmann, 'Vergleichende Studien über das Phytoplankton von Seen Schottlands und der Schweiz,' Archiv. für Hydrobiol. u. Planktonkunde, III., 1907, pp. 85-88.

The Entomostraca reach a maximum towards the end of August, about the period of highest water-temperature, in consequence of which during this period, the greatest actual bulk of plankton is collected in the nets.

The plankton of Windermere has three fairly distinct phases, which can be stated as follows :—

I.—*January-April* (cold period). *Melosira granulata* phase. During February and March the phytoplankton is at its minimum.

II.—*May-July* (vernal rise of temperature). First maximum of *Asterionella gracillima* in May and June. The Crustacea are dominant in July.

III.—*August-December* (autumnal fall of temperature). The Desmid phase extends from August to November, and is most noticeable in September and October. In November is a second maximum of *Asterionella gracillima.* The Crustacea are dominant in August.

It will be noticed that the great increase of the Entomostraca follows immediately after the enormous maximum of *Asterionella gracillima* in May and June. This affords confirmatory evidence of the conclusion arrived at by Kofoid [*] that *Asterionella* is one of the primary sources of food of the Entomostraca *Bosmina, Daphnia, Cyclops,* and *Diaptomus.*

CHLOROPHYCEÆ. The Green Algæ attain their maximum abundance in September and October, *i.e.,* at the end of the summer period and the beginning of the autumnal decline in temperature. This is in close agreement with the greatest abundance (July to the middle of October) of Chlorophyceæ in the Central European lakes, as recorded by Schröder,[†] Lemmermann,[‡] and many others.

In the April plankton numerous filaments of *Ulothrix zonata* occurred, doubtless carried into the lake by floeds in the feeding streams and becks.

All the Desmids attained their greatest abundance during the autumnal fall of temperature. The same was also true of the Protococcoideæ, but no species of this order ever became really common, although *Sphærocystis Schroeteri* was the most frequent. *Botryococcus Braunii* was only observed from August to October, and then in very small quantity.

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[*] C. A. Kofoid, 'The Plankton of the Illinois River—1894-1899,' Bull. Ill. State Lab. of Nat. Hist., May 1908, vol. VIII., art. 1, p.

[†] B. Schröder, 'Das Pflanzenplankton preussischen Seen' in Seligo's Untersuch. in dem Stuhmer Seen, Danzig, 1900.

[‡] Lemmermann in 'Forschungsb. Biol. Stat. Plön,' X., 1903; in 'Zeitschrift für Fischeri,' XI., 1903; etc.

The maximum abundance of plankton-Desmids occurs in late September, or early October, in almost all the British lakes,* and it is also the period of abundance of these Conjugates in the littoral region and in the bogs.

Bacillarieæ. The Diatoms do not attain a universal maximum at one definite period of the year, but the various plankton-species reach their maxima at different periods.

Melosira granulata has its maximum in April (temp. 1.7°C.) at the end of the cold period and the beginning of the vernal rise of temperature. This is in general agreement with the

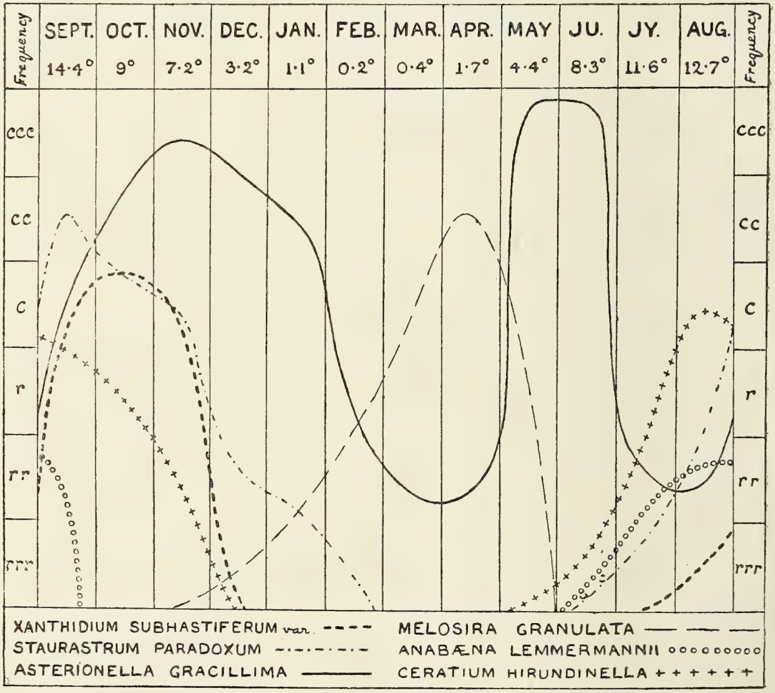

Fig. 3. Chart showing the periodicity of six of the most abundant constituents of the Windermere plankton from September 1907 to August 1908. The temperatures are in degrees Centigrade.

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* In the Schœnenbodensee Tanner-Fullemann (*vide* 'Bull. de l'Herb. Boissier, 'VII., 1907) has recorded certain species of Desmids as occurring in quantity in October.

occurrence of this species in the lakes of western Europe. In the plankton of an Australian lake, on the other hand, *M. granulata* was found to reach its maximum abundance in the middle of the warm period with a water-temperature of 21°C.[*] There is no doubt, however, that the *Melosira* phase of the Windermere plankton is from January to April or May (consult text-fig. 3), and this agrees with a similar *Melosira*-plankton described by Lemmermann as occurring in the 'Zwischenabner Meeres' from January to April.[†] In the Plöner See the same author also[‡] records a first Diatom period from January to July, and a second one, consisting principally of *Melosira distans* (a closely related form to *M. granulata*) from December to January.

Asterionella gracillima has a great maximum in May and June (temp. 4.4—8.3°C.) at which period it completely dominates the plankton (consult Pl. VII. and text-fig. 3), and a second maximum, more prolonged but not so great, from November to January (temp. 7.2—1.1°C.). This double maximum of *Asterionella*, first in spring and then in autumn, appears to be fairly general in deep lakes, and Wesenberg-Lund[§] also remarks upon a similar double maximum of *Fragilaria crotonensis* in the Danish lakes.

In investigating the periodic appearance of *Asterionella* in the reservoirs which supply the city of Boston with water, Whipple[||] suggested that the maxima were due to disturbing influences having raised up quantities of individuals from the bottom to the limnetic region (either in the vegetative condition or in the form of spores), where they found suitable conditions for rapid multiplication. He regarded summer and winter as two periods of stagnation, whereas the spring and autumn were largely periods of storm, with the necessary conditions for disturbing the water and setting up convection currents such as would raise this bottom-flora to the surface.

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[*] G. S. West in 'Journ. Linn. Soc. Bot.', 1909, XXXIX., p. 21. It seems quite likely that under the general name '*Melosira granulata*,' more than one form is included, these forms attaining their maxima under different conditions of temperature.

[†] Lemmermann in 'Ber. Deutsch. Botan. Ges.', XVIII., 1900, p. 140

[‡] Lemmermann in 'Forschungsb. Biol. Stat. Plön.', X., 1903, p. 126.

[§] Wesenberg-Lund, 'Plankton Investigations of the Danish Lakes, Copenhagen,' 1908, p. 50.

[||] G. C. Whipple in 'Technol. Quarterly,' VII., 1894; Whipple and Jackson in 'Journ. of New England Waterworks Association,' XIV., 1899.

(*To be continued*).

SOME BRITISH EARTHMITES.

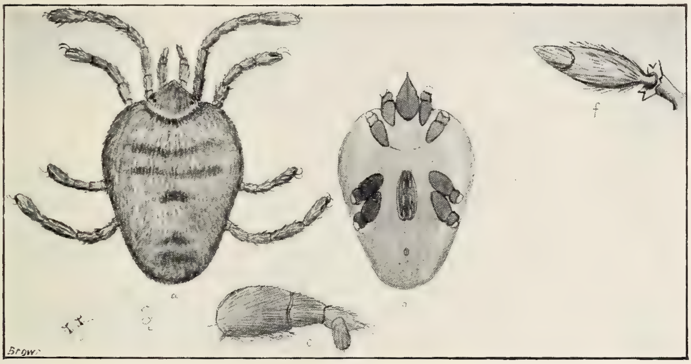
Trombidiidæ.

(PLATE X.)

C. F. GEORGE, M.R.C.S.

Ottonia conifera.—This mite is somewhat heart shaped, being much wider in proportion to its length ; it is comparatively small, not more than half the size of *bullata.* Mr. Soar's measurement is—length, 1.76 mm. The colour is orange red, and the legs of the usual formation in these mites, the front leg being the longest ; the last joint being somewhat clubbed. The palpi have two claws at the end of the fourth joint, and the fifth is bag shaped and rather small (fig. C). The eyes are prominent at the side of the cephalothorax, and have two ocelli each. The most remarkable point is the structure of the hairs, or papillæ of the back. I was fortunate enough to isolate and mount one of these, in good condition, attached to its socket. Mr. Soar has given a good drawing of this, highly magnified (fig. F.). It consists of a cone, apparently hollow, covered with very fine hairs, projecting to a point, and set in an ornamental socket, like a candle in its stick. Of course these papillæ when compressed are liable to open out somewhat, and become more cup-shaped, and the fine terminal hairs break off at the curved line, near the distal end of the papilla (fig. F.). Mr. Soar found the mite in moss at Oban ; and Mr. Evans sent me one found by him in a mole's nest early in 1908.

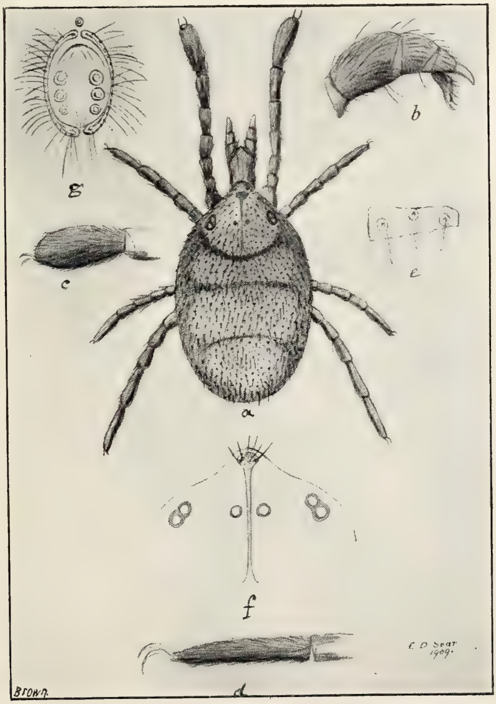
Ottonia evansii.—I have named this little creature in honour of the finder, Mr. Wm. Evans, of Edinburgh, to whom I am indebted for this and other specimens of this beautiful and interesting group of mites. In size it is rather small, and in general shape much like other members of this group ; the eyes are situated on the shoulders, one on each side, embedded in the skin, each having two ocelli. The fourth joint of the palpus has, besides the terminal claw, a smaller accessory one, not shown in the figure. The fifth joint is small, and differs considerably in shape from the others already figured, seeming to oppose the claw at the end of the fourth joint, and thus make a forceps (see Mr. Soar's figure H.). The legs are covered with very fine hairs ; the front ones are the longest, and have the terminal joint thicker and club-shaped (figure C.), the last joint of the fourth pair is rather slender (fig. D.), the hairs are not barbed. The hairs or spines on the body are simple, rather short, and



Ottonia conifera.

Oban 20-7-07. Found in Moss by C D Soar.
Light orange Red.
Length 1.76 mm. x 31.
Palpi 0.44 mm. x 100.

d. Hairs on body.
e. Eye.
f. Body hair highly magnified.



a. ***Ottonia evansii.***
b. Palpus.
c. End joint of first leg.

d. End joint of last leg.
e. Hairs or spines of back.
f. Crista.

BRITISH MUSEUM NATURAL HISTORY

not very close together. They are bent backwards, and appear to arise from small circular or oval plates of chitin (fig. E.). The Crista (fig. F.), is remarkable, inclosing at its anterior extremity a small capitulum, carrying a few shortish hairs On each side of the crista, about half way down, is a circular stigma. The Vulva (fig. G.) is also rather remarkable in having the copulatory discs placed low down, and differing a little in size, well shewn in the figure. I consider this mite a very characteristic *Ottonia*, having, however, the spines or papillæ of the back differing completely from any of those previously described.

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Dr. W. L. H. Duckworth has recently issued a Descriptive Catalogue of specimens in the Museum of Human Anatomy, Cambridge, part 2 of which deals with **'The Comparative Osteology of Man and the Higher Apes.'** This contains an illustrated description of the contents of six cases, in which are arranged casts and sections of critical bones. Though primarily prepared for the student, this catalogue has much in it of general interest, and is well illustrated.

Two Memorial Volumes have recently been issued. The first is **The Darwin Wallace Celebration** held on Thursday, 1st July, 1908, by the Linnean Society (London. 140 pp., cloth, 5/-). This contains a well-written record of the Celebrations held in London last year, together with illustrations of the Darwin-Wallace Medal, etc. There are also excellent portraits of Darwin, Wallace, Sir J. D. Hooker, Haeckel, Weismann, Strasburger, Francis Galton and Sir E. Ray Lankester. The volume includes reprints of many early notes on the question of Evolution, and is in many ways a useful one to be in the library of any naturalist.

The second volume is a record of the Centenary of the **Geological Society of London,** celebrated September 26th to October 3rd, 1907; and issued in February, 1909. Besides an account of the proceedings on that memorable occasion, it includes copies of the various Addresses presented; the Presidential Address of Sir Archibald Geikie, etc. An admirable portrait of Sir Archibald appropriately forms the frontispiece.

From an Easy Chair, by **Sir E. Ray Lankester, K.C.B., F.R.S.** Constable & Co. 144 pp.

This book contains a number or articles contributed by Sir Ray Lankester to the *Daily Telegraph.* They deal with all manner of subjects, without any regard to method, and may be looked upon as a sort of aristocratic 'Tit-Bits.' Anyway, the articles are certainly reliable, and, of course, well written; in this respect being far more acceptable than the usual drivel which appears in the daily press under the head of 'science' or 'natural history.' Possibly one object of the preparation of these notes was to counteract the flow of blithering nonsense which so often does duty as scientific news in the press, as we know Sir Ray Lankester has frequently protested against it. The book forms a pleasant and profitable comparison for an otherwise idle evening or Sunday afternoon, though we should have preferred seeing anything by this authority in other than paper covers. We should like to state that, having read the book, we have disposed of it in such a way that it will not interfere with its sale. Evidently the publishers feared that the review copy might be placed in some shop, and sold, as the words 'presentation copy' are well stamped in two places, and '1/- *nett*' is written across the title-page, although 'one shilling *net*' is printed in bold type (and correctly), on the cover.

REMAINS OF A CHIMÆROID FISH FROM THE CORAL RAG OF NORTH GRIMSTON.

H. C. DRAKE, F.G.S.

A FEW years ago I spent some time in the Malton district, and amongst other Vertebrate remains from the Corallian rocks I found a piece of bone. I recently sent this, which is embedded in a block of Coral Rag, to Dr. A. Smith Woodward, F.R.S., of the British Museum (Natural History). The specimen was obtained in the large quarry at North Grimston.

Dr. Woodward kindly informed me that it was the right mandibular ramus of *Ischyodus egertoni* Ag., and that it was a new record for the Corallian rocks of England.

The specimen measures 60 mm. from the beak to the hinder margin, and 35 mm. from the symphysial margin to the post-oral margin.

Unfortunately all the teeth are missing, but the rough depressions show where the teeth have been.

Prof. J. Phillips mentions the same species from the Oxford Clay of St. Clements ('Geology of Oxford,' p. 305).

Mr. Buckland in 1835 described the first specimen of *Ischyodus* from the Portland Oolites of Oxfordshire. This measured 7 inches in length, and is the largest specimen of the genus. It was named *I. townsendi.*

Mr. E. T. Newton figures a specimen of mandible of *I. townshendii* from the Portland Oolite of Upway, Dorsetshire, in the 'Proceedings of the Geological Association' July, 1881, p. 117. This agrees very much with my specimen, but it is about twice as large.

Dr. A. Smith Woodward also mentions two species from the great oolite of Northamptonshire in his 'Synopsis of the Fossil Fishes of the English Lower Oolites' ('Proc. Geol. Asoc.,' Vol. II., No. 6).

I have to thank Dr. Woodward for his kindness in determining this and numerous other specimens for me.

◆

Messrs. Witherby & Co. have launched a new monthly publication—**'Travel and Exploration'** (1/- net), the first part of which has been sent to us. It contains numerous well-written and well-illustrated articles, dealing with various parts of the world, starting off with 'The Nasamonians—A Call to Exploration,' by Sir Clements R. Markham, K.C.B., F.R.S. The magazine will doubtless be much appreciated by those interested in travel.

MUSEUM NEWS.

From the **Norwich** Museum we have received its Report for 1908, with list of additions, including many valuable archæological and natural history specimens; and also the First Annual Report of the Norwich Museum Association, founded 1907, under the auspices of the Norwich Castle Museum Committee. This Association, with Mr. F. Leney as Secretary, illustrates in an excellent way the practical use that may be put to a museum and its contents, by popular lectures of interest to agriculturalists, etc.

We have recently received three excellent handbooks from the Bankfield Museum, **Halifax,** written by the Hon. Curator, Mr. H. Ling Roth. The first (No. 5, 45 pp., 1/-) is entitled 'Trading in Early Days,' and is the lecture delivered before the Halifax Scientific Society last September. No. 6 (10 pp., one penny), deals with 'Hand Woolcombing,' and No. 7 (20 pp., 2d.) is an account of 'Mocassins and their Quill Work,' and is reprinted from the Journal of the Royal Anthropological Institute. All are well illustrated by drawings of specimens in the Bankfield Museum. Mr. Roth is to be congratulated upon these valuable publications.

Mr. S. L. Mosley, the Curator of the **Keighley** Museum, periodically publishes pamphlets bearing upon objects in his collection. 'These Notes are printed (1) As labels for the Museum; (2) As Lesson-Notes supplied to all the Borough Schools. Outsiders may have them sent post free by subscribing 5/- a year to the Museum.' No. 4 was issued in January, and deals with 'The Rook.' It is illustrated by coloured plates of the Rook, Cockchafer, Daddy-long-legs, Wireworm, etc. No. 5 deals with the Colts foot, and also includes reviews of recent publications; a note on the late Beaumont Park Museum, the collections from which were offered by Mr. Mosley to the Corporation, but were declined; and some rare local birds. In the last we notice 'Nutcracker—an error. A statement in Nelson's "Birds of Yorkshire" that a bird of this kind was shot in Dungeon Wood, and that I had it in the flesh is a mistake, and was inserted without my knowledge. I never had such a bird, nor had my father.' Better paper should be used for these notes.

From the **Lincoln** Museum we have received six penny publications. Nos. 1 and 2 deal with the Lincolnshire Keuper Escarpment and the Pygmy Flint Age in Lincolnshire respectively, and are reprinted from the Transactions of the Lincolnshire Naturalists' Union. These papers were referred to in these columns when reviewing that publication some time ago, so we will not refer to them more than to say they do not appear to have much, if any, connection with the Lincoln Museum. On the other hand, the two illustrated pamphlets on Roman Antiquities (Nos. 3 and 5) by the Curator, Mr. A. Smith, are just of the type the visitor requires, especially seeing that Lincoln is so comparatively rich in Roman remains. From the illustrations given, we should hardly have expected the use of the word 'graceful' so frequently. No. 4 is the Report and General Guide, which appears with one name on the cover, and two inside. In this there is evidence of the Museum having many friends, and it is pleasing to find that some specimens which had reached Lancashire have been returned. It is a pity the people of Lincoln were not alive as to the importance of these objects earlier; the present collection would then have been much richer. No. 6 deals with 'The Owls and Hawks of Lincolnshire,' by the Rev. F. L. Blathwayt, and makes special reference to the collections in the museum. We learn that Nos. 2 and 3 of these publications are already out of print, which seems a pity.

Whether there is any great monetary profit from the sales of these various museum publications or not, there can be no doubt that they benefit the respective museums, and the increasingly large number of institutions issuing them is a good sign.

NEWS FROM THE MAGAZINES.

A portrait of Thomas Bewick, in a hat, appears as frontispiece to *British Birds* for April.

'Lincolnshire Gulleries' is the title of a paper by the Rev. F. L. Blathwayt, in the April *Zoologist*.

It is proposed to form a small Limited Liability Company to take over the Proprietorship of *Knowledge*.

The number of species of Woodlice in Ireland is now twenty-three, six species having been added during the year.—*Irish Naturalist*, April.

Prof. F. E. Weiss contributes a valuable paper on 'The Dispersal of the Seeds of the Gorse and the Broom by Ants' to *The New Phytologist* for March.

Mr. A. W. Clayden records footprints in the Lower Sandstones of the Exeter district for the first time in that area (*Quart. Journ. Geol. Soc.* November 1908).

Yorkshire Notes and Queries has just completed its fifth volume. The editor appeals for a much larger increase in the number of subscribers, or the magazine must cease to exist.

A charmingly illustrated Report on 'The Eruption of Vesuvius in April 1906,' by Dr. H. J. Johnston-Lavis, has been issued as Vol. IX. (series 2) of the *Scientific Transactions of the Royal Dublin Society.*

Mr. E. W. Morse has secured examples of *Trachyphlœus aristatus* and *T. olivieri*, on the banks of the River Witham, below Boston, Lincs., under cut herbage left in heaps to rot (*Entom. Monthly Mag.*, February, p. 33).

With the January number, the well-known *Nature Notes* changes its title to *The Selborne Magazine*—practically its former name. The reason for the change appears to be that 'Nature Notes' was 'too good,' being imitated in various newspapers, and credit was not given for paragraphs borrowed from its pages.

Knowledge and Scientific News for January is a particularly good 'Special Double Number,' and contains two articles of particular interest to our readers, viz., 'The Colour of some Wild Animals" and 'Studies in Marine Life, Hydroid Zoophtes' [sic], the latter being particularly well illustrated. This magazine is to be one shilling each month in future.

'Experiences with Eagles and Vultures in the Carpathians' is the title of a paper by Mr. R. B. Lodge, in Vol. XV. of *Aquila.* It is illustrated by a number of photographs taken by the author whilst hidden in a rocky shelter, outside which he shot a horse as 'bait.' He spent eight days in photographing the birds as they came to feed. The article is accompanied by a photograph of 'the observer, our good English friend.'

The *Lancashire Naturalist* has been revived, and No. 13, Vol. II. (query No. 1, of Vol. II.) for April has reached us. The price is 4d. The editor points out that it rests with Lancashire naturalists to decide as to whether it shall appear regularly or not. We notice, however, that (like another journal we might mention) it is 'for the adjacent districts of Cheshire, Derbyshire, Westmorland, North Wales and the Isle of Man.' Why not have taken in Yorkshire and the Lake District ? The first paper, on Sparth fossils, by Mr. W. A. Parker, though an excellent one, has already appeared elsewhere. The new *Lancashire Naturalist* is evidently a much more serious journal than its penny predecessor, and if the editor is able to restrict its contents to original papers bearing upon the county, it will serve a useful purpose ; and we shall wish it *bon voyage.* Natural history of the 'Tit-Bits' type is not required in provincial journals. It can be obtained *ad nauseam* in the daily press.

BRITISH MUSEUM NATURAL HISTORY

Collecting: Geology *v.* Zoology.

THE BROAD-LEAVED WOOD GARLIC OR RAMSONS.

(*Allium ursinum*).

(PLATE XI.).

JAS. E. McDONALD.
Stockport.

> Eat Leekes in Lide [March], and Ramsins in May,
> And all the year after physitians may play.
> —*Old Proverb.*

WHO has not formed some acquaintance with the repelling garlic odour of this native of moist woods, when its bright, lily-of-the-valley-like leaves have been trampled upon in order perhaps to pluck a few of its dainty-looking flowers ?

Like the odours given off by some animals when in danger, this pungent garlic smell is protective, and tends to repel enemies who might otherwise browse upon the plant. In spite of this, cattle will eat the leaves, much to the annoyance of the dairyman, as the milk and butter is tainted thereby.

If it were not for the unbearable odour when plucked, the flowers would be in great demand for bouquets ; though when undisturbed, there is only a faint odour of garlic.

If the flower stalks be held gently whilst they are being cut, and the cut ends are wrapped with moist paper until they are carried home, there to be placed in water, the unpleasant odour passes away. One writer remarks that ' a flower in the midst of a bunch of forget-me-not, makes one of the sweetest mixtures of the season.'

No doubt both the striking appearance and the odour of the unbruised flowers serve to attract insects to the honey for the purpose of pollination. The insects seen by the writer on the flowers have been chiefly small humble bees and flies. Hive bees are said to have a great objection to the garlic smell, nothing vexing them more than this plant being thrown amongst them*. Of course, in this case, the odour caused by bruising would be pungent.

The umbels of from 12 to 20 or even 30 moderate sized flowers are raised above the foliage by the three angled peduncle (scape) during May and June. Previous to their opening, they are enclosed by a papery envelope (spathe) composed of two coherent bracts which are split apart as the flowers open.

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* Buxton's 'Botanical Guide' (1849).

The scabredity of the pedicels may possibly be of some mechanical assistance in the splitting of the spathe. The flowers are built on the same plan as the lilies, each having a perianth of six white petaloid segments, six stamens, and a three-lobed and three-celled ovary. Nectar is secreted between the rounded, bulging lobes of the ovary. Of the stamens, the three inner are somewhat longer than the three outer, and their anthers dehisce a little earlier. When the flower first opens, the style is short, and the stigma immature, but by the time the anthers of the outer and somewhat shorter stamens have dehisced, the style will have grown, and the now matured stigma brought well up to their level.

If no insect be now forthcoming with pollen—as must often be the case during inclement weather—the stigma touches an anther in the same flower, and becomes self pollinated.

Each compartment of the ovary contains two ovules, but only one of them usually ripens into a seed, so that the ripe capsule is usually but three-seeded. When ripe—towards the end of July, a little after the leaves have decayed—the carpels dehisce loculicidally to liberate the seeds. These are curved, albuminous, with a small embryo, and have a dark crustaceous testa.

Observation of the process of germination of these seeds might well serve as an introduction to the study of monocotyledonous seedlings in general, as they are somewhat easier to understand than cereals such as oats, wheat, maize, etc., so often described in text-books. The embryo of wood garlic has only one cotyledon, this being somewhat cylindrical in form. During germination (which usually begins towards the end of October) this lengthens ; one end, that concealing the rudimentary plumule and ending with the rudimentary radicle, being pushed out of the seed. Growing downwards, it buries the plumule a little distance below the surface of the soil. At this stage nearer the seed a little slit will be noticed, it is through this slit that the first leaves from the plumule will emerge after growing up the short tube from the base. Even when previously straight, as shewn in fig. 1, the portions of the cotyledon above the slit, with the seed, becomes pushed to one side by the developing scale and foliage leaves, as shewn in figs. 2, 3, and 4. The other end of the cotyledon, the apex, is modified to act as a sucking organ, and remains in the seed, absorbing the albumen, and transferring it to the developing parts of the seedling. When the albumen has all been absorbed (this taking some time), the whole cotyledon and the seed coat decay. Whilst the first leaf is developing, the radicle elongates, though not to the extent found in dicotyledons, and a little later this is supplemented by several adventitious roots from the base of the plumule, each attaining approximately the length of the radicle (see figs. 3 and 4). Only one foliage leaf* is formed the first season, and it is protected in its passage through the soil by a sheathing scale leaf (Sc , figs. 3 and 4).

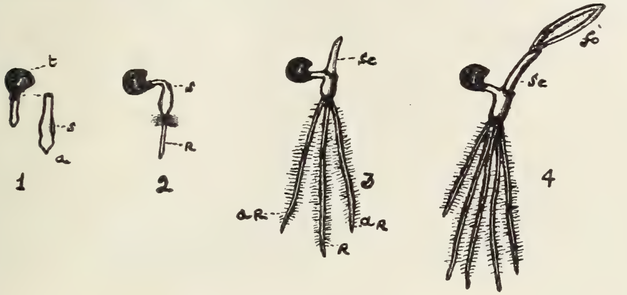
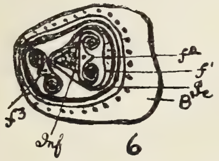


Fig. 1 to 4.—Stages of germination. A, protruded portion of cotyledon of 1 enlarged ; S, slit ; T, seed coat ; R, radicle ; AR, adventitous rootlets ; Sc , sheathing scale leaf ; Fo , first foliage leaf twisting. 1, October ; 2, November ; 3, January ; 4 ,March

A peculiar feature of the foliage leaves is that they are formed in the bud in exactly the reverse manner to those of other plants ; that is, the upper surface of the blade is formed like the under surface of other leaves. When the leaf appears above the soil, its petiole twists until the surfaces of the blade are reversed ; what was the lower or dorsal surface in the bud is then turned to the light.†

In vernation the edges of the leaves are prettily rolled towards the mid-rib, practically it may be considered revolute,



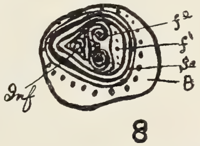


Fig. 6.—Transverse section (diagrammatic) of a mature bulb in January that will multiply, *i.e.* form two by end of season.

Fig. 8.—Transverse section of mature bulb that will only form one new bulb at end of season. Letters as in figs. 7 and 9.

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* Rarely two.

† Sydney H. Vines. 'A Students' Text book of Botany' (1896), p. 164.

but the anomalous structure of the leaf must be remembered. (Figs. 6 and 8).

Reverting to the seedling, the sheathing base of the small foliage leaf swells to form the first bulb, and has the plumule safely ensconced within it. Examination will shew that the apices of the bulbs of both seedling and mature plants appear as if they had been cut with some sharp instrument. The explanation is that a transverse layer of corky tissue is formed there before the rest of the leaf has decayed to that point, and its position can be made out by a thin transparent band some time previous to actual decay. This layer of cork, in addition to healing the wound, so to speak, prevents the access of fungi and moisture whilst the bulb is at rest in the damp soil it usually inhabits. Towards the end of May the tiny bulb now formed, comes to rest.

The next growing season (winter months chiefly), in addition to several fine absorptive roots, a thick root is given off from its base, which, when firmly fixed by root hairs near its tip, contracts and pulls the bulb deeper in the soil (fig. 5 CR). Each subsequent year the foliage leaf produced becomes larger until maturity is reached.* When there are two leaves, the base of the innermost one, which forms the bulb, becomes larger; consequently longer, and stronger, and more numerous contractile roots are required. In adult plants the new bulbs are formed a little higher in the soil than those they replace; so these peculiar roots are necessary to pull them down to the proper level which appears to be about four inches below the surface to tip of bulb.

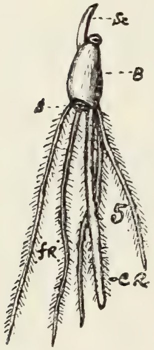

Fig. 5.—Two year old bulb (B) resuming growth after period of rest CR, contractile root; FR, fine roots; S, scar of last year's leaves; Sc sheathing scale leaf.

NOTE.—First formed bulb at this season differs only in being smaller.

(*To be continued*).

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'Was Darwin Right?' is the title of a discussion being carried on in a contemporary.

'The Claws of Insects' was the subject of the Presidential Address to the Entomological Society. It was delivered by Mr. C. O. Waterhouse on January 20th, 1909, and is printed in the Society's Transactions for the year 1908, part V.

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* Four to five years, perhaps, under favourable conditions.

FIELD NOTES.

BIRDS.

Manx Shearwater near Rotherham.—Mr. H. Moore kindly sent me a bird for identification, which proved to be a Manx Shearwater. It was picked up alive on August 24th, 1908, at Dalton Brook, on the Doncaster Road, about two miles north-east of Rotherham.—R. FORTUNE.

—: o :—

BOTANY.

A Broomrape new to Britain.—In August 1907 I found a Broomrape growing parasitically upon *Cnicus eriophorus*, within ten miles of Leeds. As it did not agree with the description of any British species, I asked the opinion of Mr. G. Claridge Druce, of Oxford. He, in turn, submitted the specimen to Dr. Beck, who has monographed the genus *Orobanche* and is the recognised European authority. Dr. Beck names it *Orobanche reticulata* Wallroth form *procera* (Koch), and states that the plant is new to Britain. Mr. Druce informs me that the hosts of the foreign plants are species of *Thistle*.—H. E. CRAVEN, Leeds.

—: o :—

FUNGI.

***Geaster fornicatus* in Yorkshire.**—This comparatively rare fungus was found, April 4th, in a hedge bottom at Masham, by Mr. W. A. Thwaites. This is the first time it has been noticed in V.C. North West. Its only two other Yorkshire records are near Doncaster (Lee's 'Flo.'); and Castle Howard (Massee's 'Mon. Brit. Gastromycetes,' p. 80). The Masham specimens were of last year's growth, but in splendid condition.—C. CROSSLAND, Halifax, April 6th, 1909.

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LEPIDOPTERA.

***Ephestia kühniella* Zell. at Skelmanthorpe.**—In January 1908 I found a number of larvæ in an oatmeal box belonging to a local grocer. They were in silken cases, about half an inch in length, secured to the sides of the box, and very plentiful. I took a few, and fed them on oatmeal, and during the following summer the moths emerged. Not being able to ascertain the name of the species, I recently sent a few specimens to Mr.

Porritt, and he informs me that the species is one of the Crambites, *Ephestia kühniella.* The species was first taken in our county by the Rev. C. D. Ash, at Skipwith in November 1898, and first recorded as British from Stoney Stratford in Buckinghamshire, in 1887. In all propability it has been introduced here, but there is no doubt about it being plentiful now.—B. Morley, February 18th, 1909.

***Sterrha sacraria* at Grange-over-Sands.**—Mr. W. Shackleton of Bradford, recently shewed me a beautiful male specimen of this rare geometrid, which he caught at Grange-over-Sands in early September 1906. According to Mr. South, six or seven specimens were obtained in Lancashire in 1867, and it is interesting to note its occurrence again in that county after the lapse of thirty-nine years. Very few records have been made of this North African species in Britain since 1874.—B. Morley, Skelmanthorpe, Huddersfield, March 3rd, 1909.

A small number of specimens have been taken in the extreme Southern Counties during the past few years, several of which are now in my collection.—G. T. P.

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MOLLUSCA.

***Paludestrina jenkinsi* in Airedale.**—In October last year, Mr. C. T. Cribb, of the Vicarage, Shipley, found, in the river Aire, above Shipton, a number of *Paludestrina jenkinsi* along with other species, on *Elodea canadensis.* The occurrence rence of this species is worth recording, as it is an inhabitant of the coast, or of the streams that occur near the coast. Yet, by some means or other, it is getting transported to various parts of our inland counties. It was recorded from the river Spen at Cleckheaton, about three years ago, and now from the Aire Valley, so high up as Skipton. It would be interesting to ascertain exactly the cause for this sporadic appearance up and down the country, it having been turned up in several other Midland Counties.—F. Booth.

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GEOLOGY.

Note on Transported Lias near Filey.—Those who have followed the elucidation of the Yorkshire coast geology, will remember that certain patches of blue clay which occur in the Boulder-clay at Filey were described by Judd as " Middle

Kimmeridge." This was a pure guess, and (like most guesses), quite wrong. I had noticed years ago that these patches contained Liassic fossils, but as I have always been afraid of being fitted with a certain proverb (' Fools step in where angels fear to tread ') I held my peace. I was glad, therefore, when Mr. Lamplugh pointed out the true character of these beds. They are simply boulders on a gigantic scale—large masses of transported Lias.

I was at Filey on March 29th, and found the shore and cliffs more swept and scoured than I had ever seen them. The rainfall had been exceptionally heavy, and the sea very rough. Consequently the blue clay beds in the cliff displayed their fossils very conspicuously. *Ostrea cymbium* was specially fine and abundant, and the characteristic *Pholadomya decorata* was strongly in evidence. I concluded that these beds in the cliff belonged to the *jamesoni* zone.

On the shore, towards low water-mark, the removal of the sand had laid bare a considerable surface of black liassic shale. These beds belong to the *communis* zone, for the characteristic ammonite abounded, with numbers of *Leda ovum*. Belemnites were plentiful, but much fractured, having doubtless been injured in transportation.

The scouring of the beach had apparently destroyed the burrows of a delicate little recent shell, *Solen pellucidus*, live examples of which were lying about with *Mactra stultorum* and *Syndosmya alba*.—Wm. C. Hey.

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At a special meeting of the Geological Society of London, a proposal to admit women to candidature for the Fellowship of the Society was rejected by fifty votes to forty.

The ' Greenwell ' collection of British Bronze Weapons, which has recently been acquired for the national collection, has been paid for by Mr. J. Pierpont Morgan, and presented to the nation.

' The Geology of the County between Newark and Nottingham ' is the title of a Memoir by Messrs. G. W. Lamplugh, W. Gibson, R. L. Sherlock and W. B. Wright, recently issued by H.M. Geological Survey.

Having heard good reports from some of our readers who have stayed at the Hotel at Oswestry, referred to in our advertisement columns, we have every pleasure in drawing attention to the excellence of the Hotel, as well as to the geological and botanical attractions of that district.

At the sale of the first portion of the late T. Maddison's (Durham) collection of Lepidoptera, sold at Steven's Rooms on February 24th last, a single variety of the Common Tiger Moth (*A. Caja*) fetched £13. The specimen was catalogued as bred at Liverpool, in July 1905. Surely a record price for a variety of this or any other moth! Two other varieties of the same moth, in the same sale brought £6 and £5 10s. respectively.

REVIEWS AND BOOK NOTICES.

Through Southern Mexico (being an account of the travels of a Naturalist), by **Hans Gadow, F.R.S., etc.** London: Witherby & Co. 527 pp., 18/- net.

We should like first to congratulate Messrs. Witherby on publishing so sound and substantial a volume as that before us. It is quite refreshing to peruse it, coming, as it does, at a time when so many publishers of natural history volumes seem to think that 'a book's a book, although there's nothing in it.' Dr. Hans Gadow is well known as a careful and accurrate observer, and he further has the ability of clearly setting forth his observations in black and white. His visit, therefore, to an inaccessible part of Mexico, where 'you do not need any arms whilst travelling, but when you do, you want them badly,' is bound to be of general interest. Together with his wife, Dr. Gadow has spent a considerable time in the remote parts of Mexico, and observed many interesting facts relating to the geology, botany, zoology, archæology, etc., etc., of that interesting area. Some of the more technical results of his travels have already appeared in the Proceedings of various learned societies, but we think the author was well advised in publishing the narrative of his rambles in the present form. He has been most successful in observing nature in her various phases, and has been able to record many interesting and important new facts. The description he gives are most fascinating, whilst now and then the details of exciting adventures of another kind add an interest to the volume. By the aid of camera and sketch-book, the author has been able to present a very graphic idea of the country he passed through, its natural history and archæological features, and its people. There are over a hundred and sixty illustrations. One drawback (if such it can be called) to the book is that when once it is well started of it must be completed, no matter how busy the reader may be. There is a very good Index, remarkable for the unusual number of X's and Z's used.

In a bulky volume of 544 pages **Mr. F. A. Bellamy** gives **'A Historical Account of the Ashmolean Natural History Society of Oxfordshire, 1880-1905.**

There is much useful information in the volume, but, on the other hand, there is much that seems trivial; for instance pp. 88-90 are occupied by extracts from the minutes in reference to the days on which the society should meet—each new secretary apparently requiring a change in the dates of the meetings!

Forest Entomology, by **A. T. Gillanders, F.E.S.** Edinburgh: W. Blackwood & Sons. 422 pp., 15/- net.

The first impression this book gives is that it is a thoroughly practical and carefully-prepared volume, and that it will at once take its place as the principal treatise on the subjects with which it deals. It is beautifully printed, and illustrated by 351 blocks, many from photographs, and a cursory glance through its pages leaves a very favourable impression. The book is largely based upon observations made in Cheshire and Northumberland, and the author has been assisted by a little army of helpers; while the way in which he has borrowed blocks from other sources puts into the shade the efforts of a certain magazine, which shall be nameless! But when one comes to carefully read the book with only a very fair knowledge of the 'common or garden' (as against 'forest') entomology, its deficiences become at once apparent, and it reminds one of the gaily dressed duchess-looking damsel on the Manx steamer, who, on being asked if the motion of the boat did not make her ill, replied 'norrit.' The author, the woods manager to His Grace the Duke of Northumberland, is most probably a very capable forester, but his knowledge of entomology is not of the best. However, he admits that 'he has just about the necessary amount of knowledge to make a beginning.' We would therefore recommend him to make a beginning, and then, after devoting some time to the subject, give us a revised issue of 'Forest Entomology.' To enumerate the many errors would not answer any good purpose, but we would suggest to Mr. Gillanders that he hand the book to some qualified entomological friend, for he apparently has several—with the request that he corrects it. Had this been done at an earlier stage, there would probably have been nothing to grumble at. As it is the book might be read with profit by those interested in forestry. The publishers have done their share well.

'One and All Gardening, 1909' (92 Long Acre, W.C., 2d.), contains articles on 'Electricity and Plant Growth,' 'The Magic Circle in Plant Life,' 'In the Track of the Fungus Hunter,' and others likely to interest our readers.

Hull Museum Publications. Nos. 53, 54, 56, 57 and 58. Hull: A. Brown & Sons, Ltd. One penny each.

This quintette of pamphlets maintain the high standard of excellence set by their fifty odd predecessors. Their range is a very wide one, a bare enumeration of the subjects dealt with would occupy more space than we can afford; and we can only briefly mention some of the more interesting. No. 53 contains an interesting account of a most valuable addition to the exhibits in the shape of a model of a tunnel shield, scale one inch to a foot, made and presented by a distinguished engineer, a native of Hull, where he received his early training. Apart from the monetary value of the donation, it is said to have cost about £700, its value as an educational exhibit in a city like Hull is inestimable.

Geologists and Palæontologists will welcome the catalogue of the Lether collection, and the descriptive account of *Eryon ? antiquus* Broderip from the Lias. Antiquaries will revel in the accounts of old agricultural implements, gibbet irons, man-traps, and spring-guns, old engravings, maps and deeds, and last, but not least, the pamphlet dealing with forgeries and counterfeit antiquities, in which, as a matter of course, the career of Flint Jack, *facile princeps* of his class is retold. Short notes on various branches of Natural History are also included.

Flint Axe-Head from Flamborough.

No. 57 is devoted to the Annual Report for 1908, which provides interesting reading. We are pleased to see that the safety of the building in Albion Street has been increased by the removal of the electric light meters from the inside to the outside of the building, and that by a resolution of the Council, the Museums are now open to the public on Sunday afternoons from 2-30 to 5 p.m. We note that this is merely as an experiment for six months, but we should imagine that if the attendances during the first three months of this year are in keeping with those for the last quarter of 1908, as detailed in this report, Sunday opening will have passed the experimental stage, and that the hours will be extended from 2 to 7, or it may be 8 o'clock. The figures given shew an average of 297 visitors per hour at Albion Street, and 34 at Wilberforce House, which seems fairly high, when one considers the limited time within which visits may be made.

The accompanying illustration, from one of the pamphlets, is a reduced drawing of a very fine polished flint axe-head recently obtained at Flamborough.

E. G. B.

NORTHERN NEWS.

Prof. T. G. Bonney will be president of the British Association meeting at Sheffield next year.

Mr. Joseph Dickenson, F.G.S. has been elected an Honorary Member of the Manchester Geological and Mining Society.

We regret to have to record the death of Dr. J. H. Baily, Isle of Man, a Vice-President of the Lancashire and Cheshire Entomological Society.

We learn from the *Hull Daily Mail* that 'It is a curious truth that a butterfly can be frozen hard, and left so for some hours, yet on being removed to warmth the insect will recover and fly away.'

The plate presented with this number (plate IX.) is an effort on the part of a well-known artist to portray a member of the staff of this journal. It also shews that there are two sides to the question of collecting.

The Sixteenth Report of the Borough of Leicester Museum and Art Gallery has recently been issued, and besides containing particulars of the changes in the institution, includes a list of the additions made from April 1st, 1905 to March 31st, 1908.

Part 6 of Messrs. T. C. and E. C. Jack's 'Wild Beasts of the World' (1/-), contains excellent coloured illustrations of the Glutton, Badger, Skunk, Otter, Coati, and Polar Bear. There are also descriptions of these, and several other interesting mammals.

We are glad to notice that one of the Lancashire Museums has unlimited exhibition space, and is making good use of it. Amongst the recent additions are '40 species British Trees, *mounted*, illustrating stages of growth.' Wouldn't they have looked better if kept alive, and '*tubbed*'?

The Perthshire Society of Natural Science continues to place on record the valuable work of its members. Its recently issued Transactions and Proceedings, published at the Natural History Museum, Perth, is full of useful papers, which are illustrated by a large number of plates from photographs of scenery, rock-sections, stone circles, etc., etc.

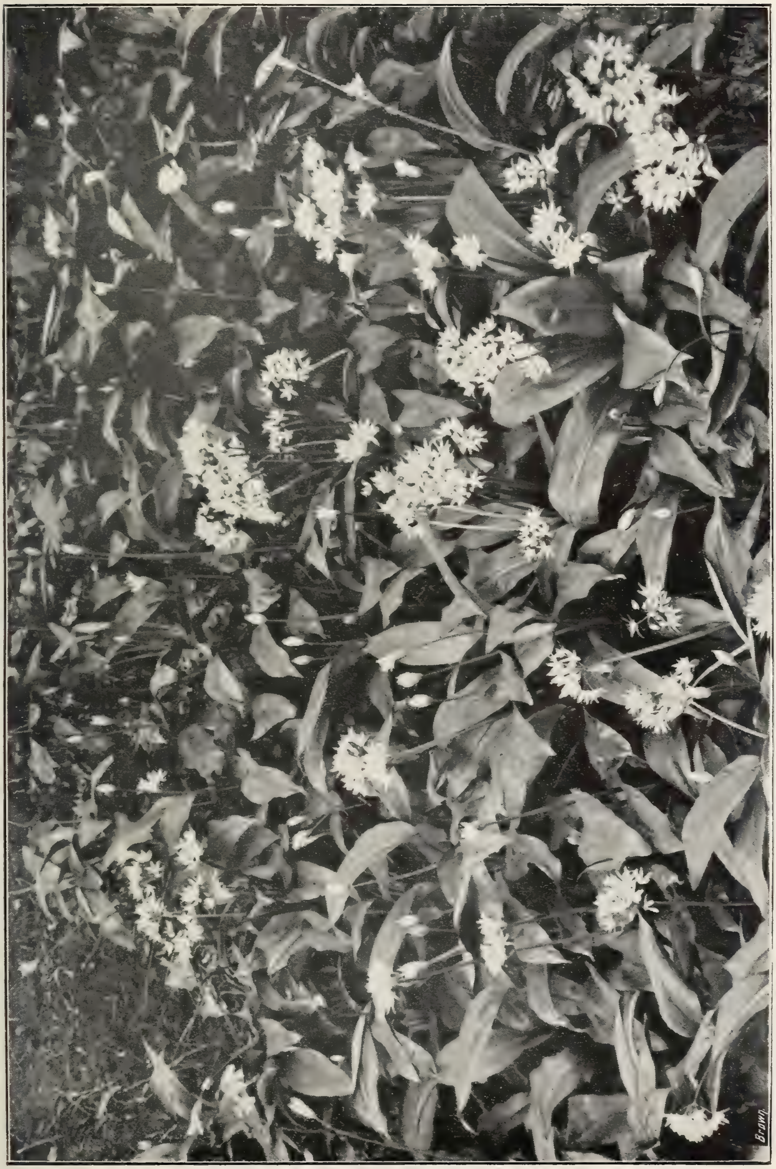
We regret to record the death of Professor H. G. Seeley, F.R.S., of King's College, London, whose writings on palæontology and comparative anatomy are well known. Professor Seeley was present at the meetings of Section 'C' at the Dublin meeting of the British Association, though he did not seem to be in his usual health. He was born in 1839.

On April 16th, at the Otley Police Court, a German waiter, employed at the Ben Rhydding Hydro, was—at the instigation of the Y.N.U. Wild Birds Protection Committee—prosecuted for shooting a Tawny Owl in the grounds of the Hydro. A unique defence was set up. Defendant pleaded that in Germany they got 3d. each for shot owls, and he was unaware of the law of this country. He was cautioned and ordered to pay the costs.

A Report of the Corresponding Societies' Committee and of the Conference of Delegates held at the Dublin Meeting of the British Association is issued in advance of the Association's Report. It is sold at the Office of the Association, Burlington House, at one shilling. A valuable feature is the 'Catalogue of the more important papers, especially those referring to Local Scientific Investigations, published by the corresponding Societies during the year ending May 31st, 1908.

We are delighted to find that Prof. P. F. Kendall is the recipient of the Lyell Medal of the Geological Society this year, and that Mr. H. Brantwood Muff, another of our contributors, shares the Lyell Fund with Mr. R. G. Carruthers. Mr. Horace B. Woodward receives the Wollaston Medal, Prof. G. A. J. Cole receives the Murchison Medal; the Murchison Fund going to Mr. J. V. Elsden. The Bigsby Medal is awarded to Dr. J. S. Flett, and Lady Evans receives the Prestwich Medal.

1 MAY 1909
BRITISH MUSEUM



Wood Garlic in a woodland near Stockport.

Photo by] [*John Farrel.*

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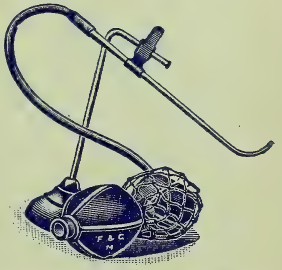

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A MONTHLY ILLUSTRATED JOURNAL OF
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T. SHEPPARD, F.G.S., F.S.A.Scot.,
THE MUSEUM, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
J. GILBERT BAKER, F.R.S. F.L.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S.,
T. H. NELSON, M.B.O.U.,
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JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.
RILEY FORTUNE, F.Z.S.

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NOTES AND COMMENTS.

THE FLAMBOROUGH PEREGRINES.

It is pleasing to note that the Peregrines at Buckton have again successfully reared their young. For some time it has been known that the birds had returned, but it was not until the 'climming' began that the exact locality of the nest was ascertained. They have bred on the same spot as last year, on the ground climbed by Hodgson, and there are two young birds in full feather. There is no doubt that the interest taken in these birds by the Yorkshire Naturalists' Union is largely responsible for their present safe sojourn on the cliffs.

SWINGS.

The accompanying photograph, which was exhibited for sale at a photographer's at Bridlington, is interesting as shewing a typical group of 'gallant lads' at Bempton, with their 'climming' apparatus. It is also of service as it possibly explains the term 'Hewett's Swing,' which has been heard once or twice recently. From the expressions on the faces there is evidently something unusually serious taking place, and in front of the Lord High Executioner is apparently the culprit, like King Charles at the scaffold, with the rope dangerously near his cervical vertebræ.

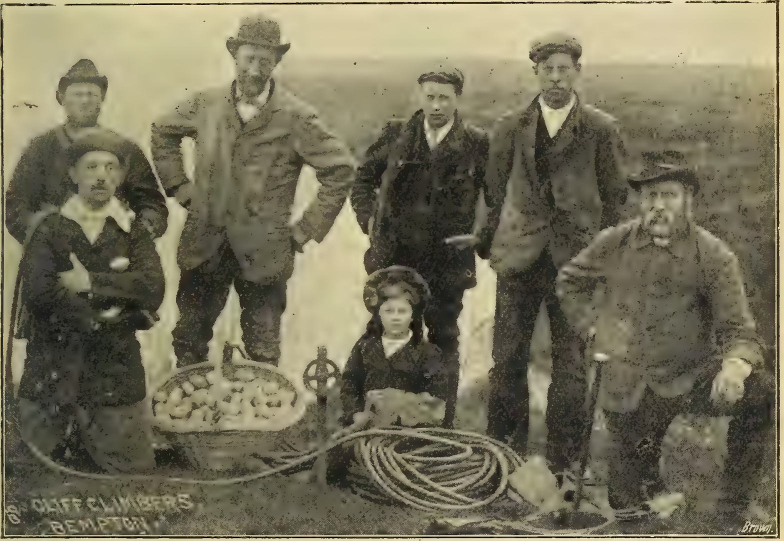


Photo by] [*Waddington & Gibson.*

THE GIRLS' REALM EXTENDED.

In the 'Girls' Realm' for March, Magdalen F. P. Tuck, who comes 'of a race whose love for the *feathered* fowls of the air is inherited from generations back,' writes on ' A Girl Cliff-Climber Down Bempton Cliffs,' the girl referred to being Magdalen F. P. Tuck, and she is actually photographed whilst over the cliff. In one of the photographs, she is represented as looking upwards, with a slack rope in her hand, possibly Hewett's swing! She is evidently an accomplished girl, as early in the article we find she writes ' I lie comfortably on my face,' which is more than many could do. We believe that is the only ' lie ' she relates, though one of the photographs was certainly not taken within miles and miles of Bempton. We are also glad to find that the printers of the ' Girls' Realm ' have a good stock of capital ' I's.'

EGGS AS TOPS.

Another magazine, which, for obvious reasons has recently adopted the title ' Science Gossip ' (though why ' Science ' it is difficult to say !) also has an article on ' The Birds on Bempton Cliffs,' the illustrations for which were also certainly not taken at Bempton. In this we learn that ' the Guillemot's eggs vary in size and marking.' The author has omitted to state that they usually have shells. ' Often very small eggs are found, but these, I think, are laid by young birds.' We were not previously aware of the protective colouring of these eggs, but ' as the chalk cliffs are all splashed with black and tufts of grass are seen sticking out of the face of the cliff wherever it can find a place to grow, so it takes one *well used to finding the eggs betore they can be made out properly,* unless the ledge happens to be near the top of the cliff, when the eggs can be seen plainly.' And all this from a source that quotes ' unnatural history ' from the press. But perhaps the most unexpected piece of gossip is ' the reason the Guillemot's egg is so pointed is that if the bird leaves the egg in a hurry, or if a strong wind is blowing the egg, instead of rolling off the ledge as an ordinary shaped egg would do, simple [sic] *spins round on the point' ! !*

THE DESCENT OF DARWIN.

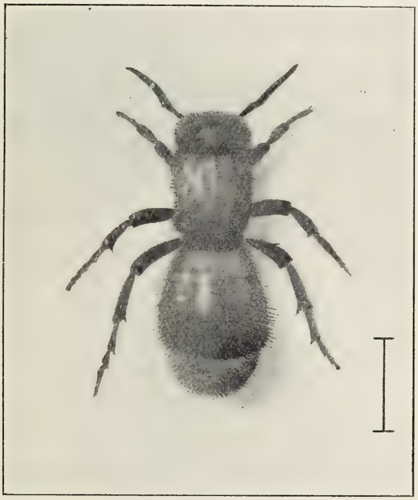
It is perhaps not generally known that Hull can claim an ancestor of Darwin as a former mayor. In 1707 and again in 1720, Erasmus Darwin was mayor of Hull ; and he was buried at Hull in 1737. This Erasmus Darwin married Elizabeth Mason, aunt to Wm. Mason, Poet and Divine. His connection with Charles Darwin is set forth on a pedigree of the Darwin family, printed by Sir Albert K. Rollit, in Wildridge's ' Northumbria,' 1888, pp. 138-140.

THE BRITISH ASSOCIATION REPORT.

The Report of the British Association for the meeting held at Dublin in September last was published as we were going to press with our May number. This is eight months after the meeting, notwithstanding the fact that practically all the volume was in type at Dublin. Surely the paging, indexing, and binding of the volume should not take so long. We are now thinking of the next meeting at Winnipeg, and at this late date the Dublin volume has lost much of its value. Now that the British Association has got a new Secretary, dare we express the hope that he will hurry forward the publication of these reports ?

THE SOLITARY ANT

In his paper on 'Glacial Survivals,' which appeared in this journal for August and September 1907, Mr. F. Elgee made frequent reference to that interesting specimen, the Solitary Ant (*Mutilla europœa*), which occurs in North-East Yorkshire. The illustration herewith is an enlarged photograph of a female Solitary Ant, the second Yorkshire example, from the moors near Robin Hood's Bay. This will enable our readers to recognise the species should they come across it.



Solitary Ant.

A PRIMITIVE DREADNOUGHT.

In this journal for June 1905 we gave an illustration of the pre-historic boat at Brigg, Lincolnshire, which had reposed buried in the clay for two thousand years or more, until unearthed during the construction of a gasometer. It then became the subject of an expensive lawsuit, decided in favour of the Lord of the Manor. It was next, at considerable cost, removed to a special brick building near the railway station, where, with its prominent label ‘ pre-historic boat ; admission 6d.’, it has formed quite a feature in that little market town for over twenty years. It has now made its last voyage, having been presented to the Hull Museum by Mr. V. Cary-Elwes, D.L., J.P., F.S.A., together with several relics that were found with it. It is carved from a single trunk of oak, over forty-eight feet long, and it is safe to say that no such tree lives in England to-day.

◆

OSPREY IN YORKSHIRE.

W. H. ST. QUINTIN, F.Z.S,, ETC.

AN Osprey spent the whole of Friday, April 30th, at Scampston. He was seen from early morning till dusk, but he was gone the next day when looked for. Though he was followed by a noisy crowd of rooks and jackdaws whenever he moved, he was constantly on the wing over our lake, fishing, and several times was seen to take a fish, probably roach, though there are a few trout, and perch.

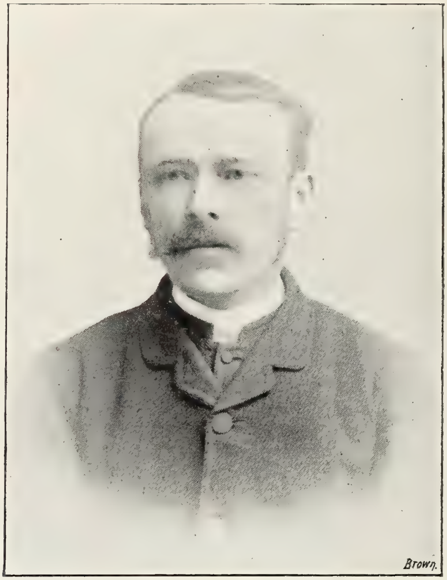
In view of the lamentable condition, as a breeding species, to which the Osprey has been reduced in these islands, it is interesting to note that individuals may still be found in spring time, winging their way north towards their old breeding grounds, and it is to be earnestly hoped that those who are in a position to do so, will do their best to ensure them security.

On the 9th of last month I saw an Osprey at Hyeres [South France], close to the old chateau. It was about 3 miles from the sea, and he was circling with lazy flaps with the wind, not more than 200 yards high as I reckoned, towards the forest which I had just left.

With the natural eye I could see something bulky in his feet, and with the glass could distinctly make out a good-sized silvery fish, probably a grey mullet, which abound in the neighbouring brackish lagoons.

In 1891 an Osprey stayed at Scampston for fully six weeks. He first appeared in mid-July, and was in moult, being probably a bird that had failed to find a mate, and was not breeding. He became quite reconciled to persons in full view, if they did not behave suspiciously. I once saw

BRITISH MUSEUM NATURAL HISTORY



Yrs very truly

W. C. Hey

'long-leg' in a village cricket-match not more than 150 yards from the Osprey sitting on an old stag-headed birch tree. I repeatedly saw this bird catching his fish, and noticed how very much a slight ruffle of breeze seemed to interfere with his success. On windy days he would have to work hard, flying for a long time without a chance, and then frequently missing his quarry. After a meal he would, from a low 'pitch,' make frequent plunges, one after another, to cleanse his plumage, as I have seen a Kingfisher do for the same purpose.

In Memoriam.

WILLIAM CROSER HEY.

(1853-1909).

(PLATE XII.).

OUR readers will learn, with deep regret, of the death of the Rev. W. C. Hey, which occurred quite suddenly and unexpectedly at West Ayton on May 19th. Mr. Hey was taken ill on the preceding afternoon at Forge Valley Station, whilst on a botanising excursion.

He was the son of the late Ven. Archdeacon Hey, Canon Residentiary of York. He received many honours at Oxford, and his first curacy was at Guisborough, where he remained till 1879. He then went as curate to his father at St. Olave's, York, and succeeded him in the living in 1883. In 1892 he retired into private life, since which date he has lived at West Ayton.

He was a keen botanist and conchologist, and has contributed many papers thereon to this journal and elsewhere. His studies were not confined to these particular branches, however, and geology and the Hymenoptera also received his attention, papers on these subjects being printed by him.

He was a frequent contributor to this journal, his last note appearing even so recently as in the April number. His writings possessed an exceptionally charming literary style.

Mr. Hey was of a retiring disposition, and usually went his rambles alone, or in the company of one friend. He now and then attended the excursions of the Yorkshire Naturalists' Union, the last occasion being on the Filey meeting in Whit week-end in 1903. Only a few days before his death we received a letter from him respecting some Hymenoptera he was trying to get for us.

By his will he leaves £20, free of duty, to the Yorkshire Naturalists' Union, of which he has been a member since its foundation.

T. S.

THE AMMONITES CALLED *A. SERPENTINUS.*

(PLATES XIII., XIV. and XV.).

C. THOMPSON, B.Sc. (Lond.),
Hull.

When engaged in research in regard to certain ammonites, I asked Mr. Crick of the British Museum (Natural History) if there were any real differences between Reinecke's '*serpentinus*' and Sowerby's '*falcifer.*' I was at once gratified by having the literature on the subject placed at my disposal by the officers of the museum.

A glance at Reinecke's beautiful figure was sufficient to show that the usual identification of *A. serpentinus* was incorrect, so I reported to the Hull Geological Society the published results of Mr. Buckman's work of twenty years ago. Recently a question by Mr. Sheppard, regarding the Yorkshire specimens, set me at work again.

I have been led to the conclusion that the Yorkshire fossil usually called *A. serpentinus* is certainly not that species. It might be correct to label it *A. mulgravius,* Y. and B., but the question is whether that species is really distinct from *A. falcifer,* Sowerby.

Mr. Buckman informs me that the authorities of the Whitby Museum have kindly placed Young and Bird's type of *A. mulgravius* in his hands for study ; that it is a large shell about 235 mm. in diameter, with inner whorls very like Sowerby's *A. falcifer.*

I have sent him a photograph of Sowerby's species, and he reports to me as follows :—'The comparison of Sowerby's small *falcifer* with Young and Bird's large *mulgravius* is difficult, because the inner whorls of the latter are so much hidden. Both species show in the inner whorls a stage of somewhat strong, broadly-flattened, primary furcating costae preceding the stage of regular, narrow, non-furcating costae.

In *falcifer,* the primary costae of the first stage are more distinct than in *mulgravius,* and the regular costae of the second stage also appear to be coarser. In *falcifer* the umbilicus is larger than in *mulgravius,* and this distinction would increase with age, while the umbilicus of *falcifer* is certainly deeper, which means that its whorls are thicker than those of *A. mulgravius.*

On these data I am inclined to think that *falcifer* would grow up to be a thicker whorled, more strongly-costated and more widely umbilicated species than *A. mulgravius* ; wherefore though the two forms are evidently closely allied, I think it desirable to retain the two names.'*

The above confirms my own work on the common Yorkshire fossil, the result of which is, that the type described and figured below is the adult of *falcifer*.

The following extract from d'Orbigny† will give the history of the names, and is that author's opinion on the matter :—'Reinecke, en 1818, a décrit et figuré cette espèce presque adulte, sous le nom d'*Argonauta serpentinus*, et jeune sous celui de *Cæcilia*, dont Schlotheim a fait, en 1820, les *A. serpentinus* et *capellinus*. La même année, Sowerby appelait l'adulte *Strangewaysii*, et le jeune *Falcifer*. Deux ans après, de l'adulte encore, Young et Birds, en 1822, faisaient leur *A. Mulgravius*. Il en résulte que l'espèce a six noms distincts, dont le plus ancien est *Serpentinus*, qu' on doit conserver ; ainsi les noms de *Cacilia*, de *capellinus*, de *Strangewaysii*, de *Falcifer* et de *Mulgravius*, employés quelquefois par les auteurs, doivent être renvoyés à la synonymie.'‡ It appears from this extract that d'Orbigny, following Schlotheim's description of what seems to me to be an intermediate form, figured a specimen much resembling *mulgravius* as *serpentinus*, and suppressed the English name.

Bayle, Wright, Blake, and others, followed d'Orbigny. Confusion arose in consequence, since we had so many names attached at different times to one ammonite, which names had really been given by their authors to various species.

This is exceedingly strange, for Reinecke's figure is so clear and he took the further trouble to give a section of his specimen ; Young and Bird, also followed by Simpson, described *mulgravius*, one would think sufficiently well.

The three ammonites under discussion are really unlike one another, especially *A. serpentinus* and *A. mulgravius*, as the accompanying plates alone will show.

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* In Litt., May 7th, 1909.

† 'Terrain Jurassique,' t. I., p. 218.

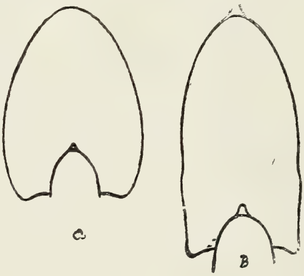
‡ [TRANSLATION—Reinecke in 1818 described and figured this species, almost adult, under the name of *Argonauta serpentinus*, and young, under that of *Cæcilia*, from which Schlotheim in 1820 made *A. serpentinus* and *capellinus*. In the same year Sowerby named the adult *strangwaysii*, and the young form *falcifer*. Two years afterwards, from the adult again, Young and Bird, in 1822, made their *A. mulgravius*. As a result of this the species has six distinct names, the oldest of which is *serpentinus*, which ought to be kept ; so that the names, *Cæcilia*, *capellinus*, *strangwaysii*, *falcifer* and *mulgravius*, sometimes used by authors, ought to be relegated to synonomy].

Mr. Buckman wrote in the ‘ Geological Magazine ’ for 1887, that Oppel, in his ‘ Juraformation,’ p. 243, noticed the blunder and kept both species (*falcifer* and *serpentinus*) distinct ; that Dr. Haug, in his ‘ Beiträge Monog.’, 1885, drew pointed attention to the fact of *falcifer* having been generally figured for *serpentinus* ; also that Dr. Haug separated *Am. serpentinus* totally from *Am. falcifer*, placing the former in the group of *bifrons*, and so in Hyatt's genus *Hildoceras*. Both Oppel and Haug give *mulgravius* as a synonym of *falcifer*.

Below will be found Sowerby's own description of his *falcifer*, Buckman's description of *Strangwaysi* for those who have never seen the type ; and finally, a contrast of the characters of Reinecke's *serpentinus* and of the most common Yorkshire type, which former collectors called *mulgravius*

It will, however, be seen from the plates and Mr. Buckman's comparison above, that it is not the typical *mulgravius* of Young and Bird, for that does not for one thing possess those coarse broad ribs on the outer whorl.

The following is Sowerby's description of *falcifer*. (‘ Min. Con.’, Vol. III., p. 99) Spec. Char. :—‘ Discoid ; radiated ; radii curved and suddenly bent in the middle ; inner volution half exposed ; margin convex, carinated ; whorls convex on their sides ; aperture elliptical.



(*a*) Section of last whorl of Sowerby's ‘*falcifer*.’ (Natural size.)
(*b*) Section of last whorl of the adult specimen figured on plate XIV. (½ nat. size).
(Both these drawings have been very slightly reduced in reproduction).

‘ The diameter is little more than twice the length of the aperture. The radii are numerous and close together ; as they diverge from the centre they turn a little forward, then bend suddenly back, and afterwards proceed in regular semi-circles to the margin, somewhat resembling the curve of a reaping-hook. The inner edge of the turns is elevated and obtuse. This nearly resembles the last [*A. strangwaysi*], but is not so flat, and wants the flat surface of the inner margin of the whorl. It is from the Inferior or Iron-shot oolite of Ilminster.

The following is the description of *Harpoceras Strangwaysi* (Sowerby sp.), from Mr. Buckman's paper :—' Discoidal, compressed, hollow carinate ; whorls flattened, with genuine sickle-shaped ribs, less conspicuous on body chamber, but there more distinctly bent. Ventral area marked by prolonged sweep of ribs and surmounted by a well-marked hollow carina. Inner margin, almost upright, neither convex nor concave. Umbilicus shallow, open. Inclusion about one third ; aperture oblong. Sowerby's figure not correct. Inner margin wrong, sectional view wrong. Ribs do not bend enough since they should have a true sickle-shape. His suture lines are right.'

' *Harpoceras Strangwaysi* differs from *Harpoceras falciferum* in having a more open umbilicus, about one-fourth larger ; ribs are not quite so curved, and inner margin is nearly upright instead of undercut. Fish bed, Upper Lias, Byfield, Trent ; Ilminster, Sowerby.'

A contrast of the characters of the other two types :—

A. mulgravius. (?) (Of collectors). PLATE XIV.	*Hildoceras serpentinum.** PLATE XIII.
The shell has a very flat and discoidal appearance. The whorls are broad ; the outer one being in the earlier stages of life nearly half the diameter of the shell. In early life, too, each whorl is rather deeply indented by the preceding one, but one of the characteristics of the species is, that the amount of inner whorl covered by the outer one continually decreases with age, until in the last stage the body whorl covers a little more than a quarter of the preceding one.	This also has a flattened and discoidal appearance, but the whorls are not so broad as in *mulgravius*, nor Sowerby's *falcifer* ; roughly three-quarters for the same sized shell.
Therefore the relative size of the umbilicus to the whole shell is continually increasing with age. In consequence of the flatness of the inner third of each whorl, the umbilicus descends to the centre by a number of broad flat steps.	The umbilicus is large and open, for the whorls enclose very little of each preceding one. The coiling is regular ; that is, the amount of involution does not vary with age as in the species compared with it.
The inner margin of the whorl is also characteristic, being undercut, or, if it be preferred, it slightly overhangs the preceding one. In	The inner margin is obliquely flattened, the slant being down towards the centre of the shell, not away from it.

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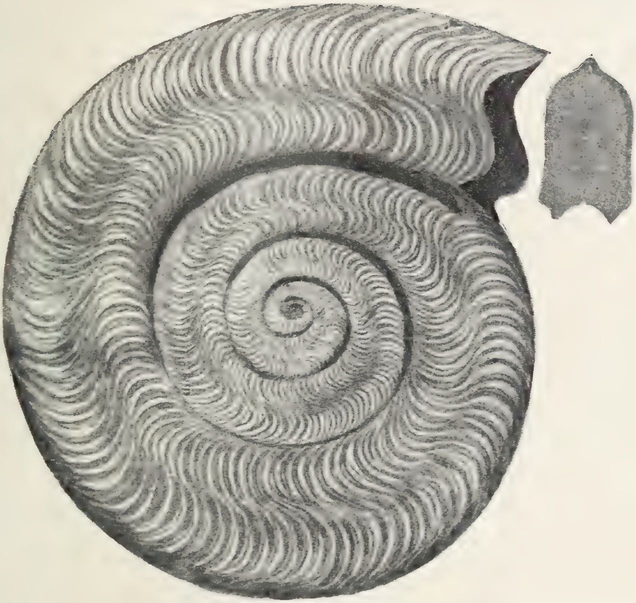
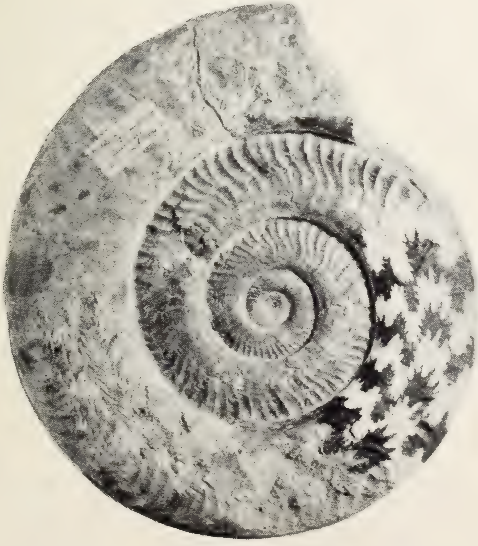
* Description mainly from Mr. Buckman's paper.

the very young, the whorls are elliptical in section, then for a very short distance the inner edge is vertical, but soon it becomes overhanging, and the section can no longer be said to be elliptical.	
A little less than half-way across each whorl is a well-marked longitudinal furrow. On the ventral area (popularly 'the back') is a well-defined septate keel without bordering furrows. A septate keel is one which is separated from the chamber by a ribbon of shell, so that when the keel is knocked off the ventral area appears rounded. This character is well shown by many specimens.	Has no longitudinal furrow on the sides of its whorls. The keel is non-septate, so that the mould is exactly the same shape as the shell ; the mud filling the keel which is entirely open to the chambers. Two slight furrows border the keel, but die away on the body whorl.
The ornamentation is also characteristic. The ribs are distinctly sickle-shaped. In the young there is a stage in which there are short primary ribs which bifurcate but soon they become single, broad and flat. Passing from the umbilical edge, they curve gently forward, then at the groove, take a sudden bend backward, and at once sweep round in a prolonged curve towards the mouth of the shell, becoming more prominent, broader and rounder as they do so. They then die out at the base of the keel.	The ribs are sigmoidal, almost exactly like the letter 'S.' Not very plain on inner margin.
In the adult form when the shell is preserved, the ribs are seen to begin at the edge of the umbilicus, almost as narrow elevated lines, each alternate one developing the above character, while the others proceed only about half or two-thirds across the whorl as quite subsidiary, or intervening ribs. This character is not visible in the cast.	
In well-preserved and carefully cleaned specimens, the ribs are seen to be present on the slanting wall of the umbilicus, and pass *backward* at an angle of about 30°, but turn sharply forward on the very edge of the whorl, to take the direction given above.	
The suture lines are very much foliated, being deeply indented by narrow accessory lobes. They crowd one on the other, so that even in young shells no larger than 30 mm. they actually overlap.	The suture lines are much simpler, they are rather remote, or distant from one another, and resemble those of '*bifrons*' very closely.
The external or ventral saddle has the prominent deep accessory lobe characteristic of the genus *Harpoceras*.	

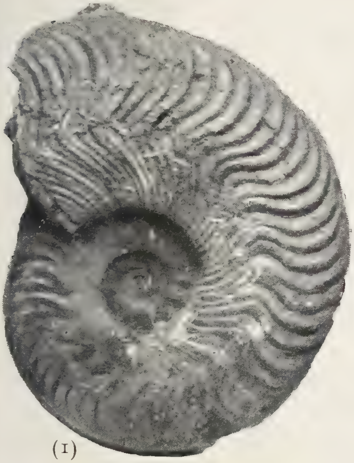


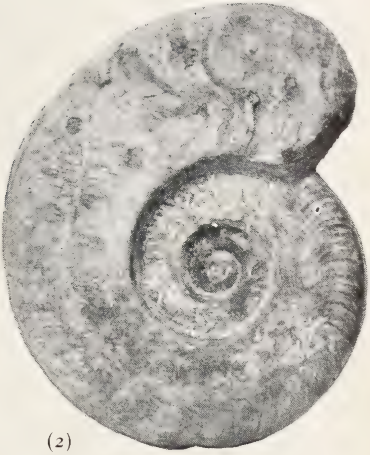
Copy of Reinecke's original figure of *Am. serpentinus*, (*Hildoceras serpentinum*); from negative lent by Mr. S. S. Buckman. (Very slightly reduced; trans. diam. should be 71 m.m.)



Hildoceras serpentinum, (Rein. sp.). From photograph of specimen in the collection of Mr. S. S. Buckman. Photographed by Miss Buckman. (A little over ⅔ nat. size).

BRITISH MUSEUM NATURAL HISTORY

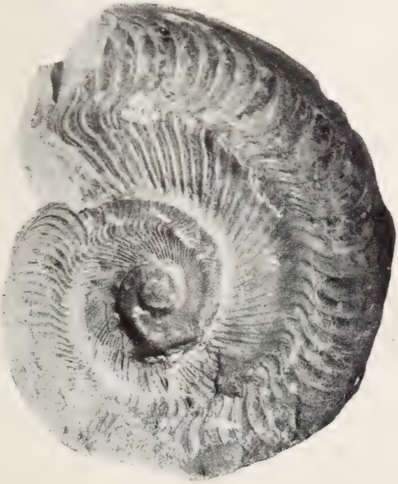

(1)


(2)

(1) *Am. falcifer*, Sow. sp. (*Harpoceras falciferum*). (Nearly natural size; diameter should be 58·5 m.m.)

(2) *Am. strangwaysi*, Sow. sp. (*Harpoceras strangwaysi*). (Reduced to about $\frac{2}{5}$ nat. size).

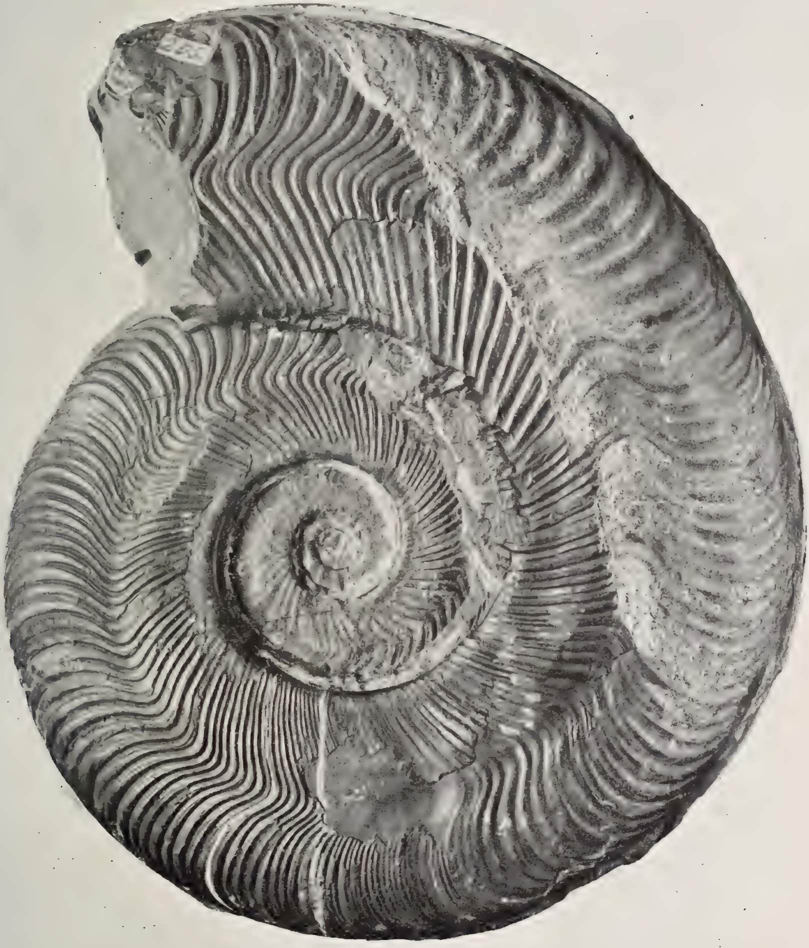
From photographs of Sowerby's *original type specimens* supplied by Dr. A. mith Woodward.



"*Am. mulgravius.*" (?) (Of collectors). Also wrongly named by many "*Am. serpentinus.*"

The adult *Harpoceras falciferum* of the foregoing paper. From photograph of Yorkshire specimen in Hull Museum, supplied by Mr. Sheppard. (Reduced to about $\frac{1}{3}$ nat. size).

BRITISH MUSEUM NATURAL HISTORY



Harpoceras mulgravium. From photograph of Young and Bird's *original type specimen* of *Am. mulgravius.*

Block, the copyright of Mr. S. S. Buckman. Photographed by Mr. J. W. Tutcher, Bristol. (Reduced to about ½ nat. size).

BRITISH MUSEUM NATURAL HISTORY

To sum up, *Am. serpentinus*, (Rein. sp.), *Am. falcifer* (Sow. sp.), and *Am. strangwaysi*, (Sow. sp.) are distinct species. In Yorkshire, we appear to have two forms—one very common, which seems to be the adult of *falcifer*, and therefore would be named *Harpoceras falciferum*, the other, an allied form, which should be kept distinct under the name *Harpoceras mulgravium*.

It is my most pleasant duty to thank Mr. Buckman, who, with generous self-sacrifice, has placed at my disposal the materials for the first plate, and especially for his advice; Mr. J. W. Tutcher, for the use of his valuable photograph of Young and Bird's type, which was needed to complete the paper; Dr. A. Smith Woodward, for the very necessary photographs of Sowerby's types, and for the use of the British Museum (Natural History) Library; Mr. Sheppard, for the photograph of the Yorkshire specimen in his charge at the Hull Museum; and Mr. J. W. Stather and Dr. Walton, for procuring for me some of the requisite literature.

It is obvious that without this generous help the present paper could not have been prepared.

I wish also to thank the editors for so liberally illustrating the paper, and so enabling photographs of all the types under discussion to be seen together for the first time.

LIST OF WORKS OF REFERENCE FOR ABOVE PAPER.

1818, Reinecke, I. C. M.—'Maris protogaei Nautilos et Argonautas,' etc.

1820, Schlotheim, E. v.—'Die Petrefactenkunde,' etc.

1820, Sowerby, J.—'Min. con.', Vol. III., p. 99, t. 254.

1822, Young, G. and Bird, J.—'A Geological Survey of the Yorkshire Coast.'

1842-49, Orbigny, A.d'.—Paléontologie Française. Terrain Jurassique, t. 1.

1876, Tate, R., and Blake, J. F. —'The Yorkshire Lias.'

1878-86, Wright, T.—'Monograph on the Lias Ammonites.

1884, Simpson, M.—'The Fossils of the Yorkshire Lias,' 2nd Edition.

1887 and 1889, Buckman, S. S.—On Jurassic Ammonites, 'Geol. Mag.', dec. III., Vol. IV., p. 396; and Vol. VI., p. 200.

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We have received '**Book Auction Records**' (Vol. VI., part 1), published by Karslake & Co., London. This book is issued quarterly at a subscription of £1 1s. per annum. The part before us contains 3383 records of sales made during the quarter ending December 31st, and from the numerous details given relative to each lot, is a most useful guide to the librarian or private collector. The present number contains 'Notes on Hull Authors, Booksellers, Printers and Stationers, etc.', by Mr. W. G. B. Page.

RECENTLY DISCOVERED FUNGI IN YORKSHIRE.

C. CROSSLAND, F.L.S.

(Continued from page 182).

PENIOPHORA HYDNOIDES Cke. & Mass.

N.E.—Osmotherley, on dead branches. (*' Nat.', Nov. '08, p. 410). [To follow No. 1185].

TYPHULA GRACILIS Berk. and Desm.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To precede No. 1248].

PUCCINIA PERPLEXANS Plow.

Æcidiospores on *Ranunculus acris.*

S.E.—Hornsea. (*'Nat.', Aug. '08, p. 310)

[To precede No. 1348].

HYPOCREA STROBILINA Phil. & Plow. Grev. XIII., p. 79.

N.E.—Osmotherley, on decaying pine wood. (*' Nat.', Nov. '08, p. 410). [To follow No. 1434]

EUTYPA SCABROSA (Bull.) Fckl.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 26). [To follow No. 1553].

LOPHIOSTOMA ARUNDINIS (Fr.) Ces & De Not.

S.E.—Hornsea, on dead stems of *Phragmites communis.* (*' Nat.', Aug. '08, p. 310). [To follow No. 1622].

RAPHIDOSPORA ULNASPORA.

N.W.—Brafferton, on dead nettle-stems. (*' Nat.', July, '08, p. 284). [To follow No. 1642].

HEPTAMERIA GRAMINIS Fckl.

N.E.—Terrington, on *Phragmites communis* (Grev. Mar. 1890, XVIII., p. 59). This record was accidentally overlooked when the ' Y.F.Flo.' was compiled.

S.E.—Hornsea, on *Phrag. communis.* (*' Nat.', Aug. '08, p. 309). [To follow No. 1469).

TAPESIA FUSCA var. prunicola.

Mid. W.—Buckden, on *Prunus communis.* June '06, Thos. Hebden.

GLŒOSPORIUM PODOGRARIA Mont. & Desm.

N.E.—Mulgrave Woods. (F.F., '08, ' Nat.', Jan. '09, p. 27). [To precede No. 2281].

OOSPORA FULVA Sacc. and Vogel.

S.W.—Among moist cotton on which date stones were being germinated, The laboratory, W. R. River's Board, Wakefield. April 1908. J. W. H. Johnson. [To follow No. 2298].

ASPERGILLUS NIGER Van Teigh.

S.W.—Thornhill, near Dewsbury. On dates; probably introduced with the fruit. Was successfully cultivated on *prune agar* medium, by J. W. H. Johnson, Thornhill, April '08.

ASPERGILLUS GRISEUS Link.

S.W.—Wakefield, in the laboratory. W. R. Rivers' Board, on Petri dish culture of bacteria. Mar. '08, J.W.H.J. [To follow No. 2318].

PENICILLIUM HYPOMYCETIS Sacc.

S.W.—Firbeck, spreading over a group of *Trichia fragilis.* (F,F., 1905. Accidentally omitted). [To follow No. 2320].

OVULARIA INTERSTITIALIS (B. & Br.) Mass.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 27). [To follow No. 2342].

TORULA EXPANSA Pers.

N.W.—Brafferton. On decaying nettles. (*'Nat.', July '08, p. 285). [To follow No. 2371].

PERICONIA PYCNOSPORA Fres.

S.E.—Hornsea. On dead herbaceous stems. (*'Nat.', Aug. '08, p. 310). [To follow No. 2381].

MENISPORA CILIATA Corda.

N.E.—Osmotherley. On dead decorticated wood. (*'Nat.', Nov. '08, p. 411). [To follow No. 2391].

CLADOTRICHUM COOKEI Sacc.

N.E.—Osmotherley. On dead wood. (*'Nat.', Nov. '08, p. 411). [To follow No. 2401).

MACROSPORIUM COMMUNE Rabh.

S.E.—Hornsea. On grass. (*'Nat.', Aug. '08, p. 310). [To follow No. 2427].

TUBERCULARIA BRASSICÆ Lib.

N.E.—Mulgrave Woods. (F.F., '08, 'Nat.', Jan. '09, p. 27). [To follow No. 2460].

LAMPRODERMA ECHINULATUM Rost.

Mid. W.—Buckden. On rotten wood. A. R. Sanderson, Bradford, 1908. [To precede No. 2508]

ADDITIONAL HOSTS.

Puccinia orchidearum-phalaridis Kleb.

Æcidium on *Listera ovata.*

S.E.—Hornsea. (*' Nat.', Aug. '08, p. 310). [To follow No. 1399].

P. rubigovera.

Æcidium on *Lycopsis arvensis.*

S.E.—Hotham Cross, near South Cave. R. H. Philip. (' Trans. Hull Sci. and F.N.C.', May '08, p. 22).

' Mr. Hawley informs me that in 1907 he found this Æcidium on *L. arvensis* plentifully at Tumby, Lincs., early in September, and that he had not seen it previously.'—(R. H. P.).

Peronospora sparsa Berk.

Mid. W.—Grassington, on living leaves of *Poterium officinale.* (F.F., 1907).

CONFIRMATION OF DOUBTFUL RECORD.

Geaster rufescens.

When the ' Y. F. Flo.' was compiled, the record of this species for Pond Wood, near Boynton (' Nat.', July 1889, p. 192) was considered doubtful, and so bracketed. In October 1907, a fine species of undoubted *G. rufescens* was found on bare soil under a sycamore tree, by the gardener in the grounds of Mr. Whitley Thompson, Skircoat, Halifax. V.C.S.W.

Naucoria nucea (Bolton) Sacc. (' Nat.', '08, p. 385).

NOTES ON A HUMARIA AND A GORGONICEPS.

On December 10th, 1908, Mr. Wilfred Robinson, Hull, sent me a few ascophores of a discomycete, gathered on soil in the Hull Dock Reservation. They come near *Humaria Chateri* in general appearance, but differ in the spores being much larger and more coarsely tuberculate than one would be given to understand by the English descriptions. ' Phillip's Brit. Disc.', p. 89, gives the spores of *Chateri* as ' *biguttalate, asperate,* 12 × 5 μ,' and quotes ' Gard. Chron.', 1872, p. 9, with figure ; ' Jour. Bot.', 1872, p. 86 ; ' Grevillea I.', p. 120, p. 8, figs. 1 and 2 (reproduced from ' Gard. Chron.). Massee Vol. IV., p. 405, says :—' *epispore minutely reticulated,* 13-16 × 7-8 μ. The spores of the Hull ascophores are 20-21 × 9 μ (no guttæ were observed) ; Boudier, to whom specimens were submitted, considers them even larger still (22-25 × 11-13 μ), and remarks, ' very near

Chateri, but differs in the spores being larger, and the hairs thicker. It may be a variety of this very variable species, or, the shape of the spores and hairs may indicate a different species.' Boudier places *H. Chateri* in his genus *Melastiza.* Dr. Rehm, in ' Rabh. Kryt. Flo. (Disc.) p. 1059, places it under *Lachnea.* According to our idea it comes between *Lachnea* and *Humaria.* Rehm gives the spores of *Chateri* ' 1-2 *guttulate, coarsely warted,* 15-20 × 9-10 μ ' ; asci 200-250 × 12-14 μ ; ours are 280-320 × 12-14 μ. Saccardo refers to German and Italian forms with spores 16-17 × 7-8 μ.

Although doubtful, all points considered, perhaps it will be best to leave it with *Chateri* at present. The Hull specimens have been carefully figured and described.

Gorgoniceps Guernisaci (Crouan) Sacc. var. *vibrisseoides* Mass.

Helotium vibrisseoides Peck, ' 32nd Report,' 1879.

Vibrissea turbinata Phil. ' Trans. Linn. Soc.', 1881.

Gorgonceps vibrisseoides Sacc. ' Consp. Gen. Disc.', p. 7 ; ' Syll.', VIII , p. 505.

Apostemidium vibrisseoides Boud. ' Ann. Myc.', 4 ; 200, 1906 ; ' Disc. Eur.', p 91 (1907) ; Durand, the Geogloss. ' North America Ann. Myc.' (Berlin, 1908) VI., pp. 457-8, pl. XI., figs. 119-120. On dead branches, near small waterfall, in hillside rill, High Greenwood, near Hebden Bridge, August 1904, Dr. Durand, J. Needham and C. C.

As will be seen above, this variety has been considered by several mycologists to be a distinct species. In my opinion, Massee (' Brit. Fung. Flo.', IV., pp. 488-9) is quite right in placing it under *G. guernisaci* as a variety. Characters confined solely to the paraphyses, such as their more or less profuseness, presence or absence of a slight brown tinge at their apices, or their varying from simple or occasionally forked to repeatedly forked towards their tips, scarcely justify the raising of a variety to a species.

ERRATA.—Delete ' var. *sclerotiorum,* on decaying herbaceous stems,' Topcliffe Excursion. (' Nat.', '08, p. 285).

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In *Knowledge* for May, Mr. W. G. Clarke writes on ' Striæ on Neolithic Flint Implements.' In this he points out that humanly worked surfaces of the flints are scratched and ' our geological knowledge affords us no other possible course of these striæ than glacial action.' This means that neolithic man must have existed during or before the Ice Age. We don't believe it !

SERMONS IN STONES.

The Stone Ages in North Britain and Ireland, by the **Rev. F. Smith.** Blackie & Sons, 377 pp., 16/- net.

There is no doubt that this is one of the most remarkable books that has appeared during the present century. At first we thought it must be a reprint of a work originally published about 1750. But it is not. The 'Dedication' is a novelty anyway. It begins, 'During the forty years many friends come and go,' and the author forthwith proceeds to 'dedicate' to a whole army of naturalists, etc., past and present. And then Dr. A. H. Keane eulogises Mr. Smith, and refers to his extraordinary work. Apparently largely to Dr. Keane's influence, the present book has made its appearance. In this we are not quite sure whether Dr. Keane has acted well for Mr. Smith. He concludes by designating Mr. Smith 'the Boucher de Perthes of Scotland,' though we think 'Boucher de Purrth' would have been better.

In his quest the author is, admittedly, very largely alone. The late Sir John Evans, referred to as 'doubting Thomas,' and several other authorities who have restricted their collections to 'orthodox forms,' do not see eye to eye with Mr. Smith. But that is evidently their misfortune.

Mr. Smith is obviously an enthusiast, and is not damped by any amount of cold water. His reception at the British Association, at University Museums, and other trivial places of a like character, have not proved encouraging; yet he has gone on. He is one of those who sees weapons in the running brooks, flayers in stones, and implements in everything. He has spent forty years in picking up weapons and tools in places where the bigoted specialist would not look. Mr. Smith searches the boulder clay, the old river gravels, the beds of streams, and the sea shore. All these localities have yielded scores and scores of 'weapons' to him. He has found three hundred palæoliths in Scotland, also mullers, flayers, knives, choppers, clubs, etc. He is very strong on 'handles.' A pebble or a boulder, narrower at one end than the other, is provided with a 'handle.' Usually those found in streams or on the beach are 'mellow' with age. What an ordinary mortal would look upon as cleavage planes or ordinary natural fractures, to Mr. Smith are 'boldly struck flakes.' A stone shaped like a scapula is proved to be a palæolithic implement by the author providing illustrations of shoulder-blades in the Dublin Museum. Jaw-bones, etc., are used in the same way. And the implements Mr. Smith finds are not restricted to flint; they can be made from basalt, granite, sandstone, limestone—in fact, from any rock that is subject to wear and tear in a stream or on the beach. 'Fig. 45 is a boldly struck-out specimen, which, so far as one can judge (for it is highly [sic] rolled), was fashioned from a yet more highly rolled stone—one so rounded that we should have called it a pebble. Fig. 40 is of the same type of work, but it was wholly sculptured out of a mass of basalt. This last is scarcely at all water-worn, but is mellowed and minutely honeycombed in the usual way by long submergence at the bottom of the sea, and has lost its point. This is an Ayrshire-coast specimen.'

Quite a large proportion of his specimens have lost their points, or, sides, or both, and these are shewn in the very excellent drawings by 'restorations.' From these it is pretty clear that had Mr. Smith's palæoliths been perfect when found, they would have been tolerably good neoliths. Size is no object. One beach-specimen was so weighty that a cab had to be requisitioned. Then the question arose as to what use such an implement could be? Only Mr. Smith could have solved it. The weapon was a guillotine trap! It was hung by a cord on a tree. The mammoth passed underneath, snapped the cord, down came the weapon, and the elephant died! Here and there a fairly passable implement is figured—one somewhat approaching the 'orthodox' type, but, with the author's extraordinary bad luck, such specimen has generally been lost or stolen. Two unexpected but not surprising illustrations occur in figs. 308 and 309. These represent the front and side views of the fractured lias nodule found in the boulder clay at Scarborough a year or two ago, which was to have formed the subject of a paper on 'Glacial Man in Yorkshire' at the British Association Meeting at York, but didn't. In the present work it is recorded as from the 'Lower Trias,' and was found at Sewerby, but we recognise it all the same. Like Mr. Smith, the present writer examined it several times. Mr. Smith calls it 'a more than usually fine specimen,' and a 'magnificent specimen of pre-glacial man's handiwork.' In the opinion of the present writer, this unusually fine implement is a perfectly natural nodule, and was not touched by man till picked up 'with difficulty'! out of the boulder clay at Scarborough. And as Mr. Smith admits it is one of his best pieces of evidence, he confirms the impression already stated by an examination of his drawings, viz., that his specimens are practically all perfectly natural forms, which, in Mr. Smith's eyes, seem to shew some semblance to weapons. There is no doubt that a brief search upon any beach, or in any river bed would yield dozens of such specimens as Mr. Smith figures—in fact, he admits it himself.

There is one direction in which Mr. Smith has neglected his subject, and we would commend the matter to him in case a second edition of his book is called for. In streams, and gravel pits, and on the beach, are numerous egg-shaped stones, sometimes quite 'mellow.' May not palæolithic man have kept pigeons and chickens, and may not these be his pot eggs? And how do we know he didn't play golf?

In his early remarks the author states 'May I hope that the substance of this volume will prove a revelation to the scientific world? It has been such to myself.' And it has been to us. The volume weighs three and a half pounds, and there is no index.

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FUNGI.

***Geaster fornicatus* in Lincs.**—Mr. F. Mills sends two fine specimens of this curious fungus from Torksey. They bear a strong resemblance to children's dolls, or models of the pigmies who chipped the small flints! Mr. Peacock records some taken in Bottesford Parish in 1869, and one since, I think, from Torksey. Is it 'comparatively rare,' or easily overlooked on account of its protective colour?—W. FOWLER, May 5th, 1909.

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GEOLOGY.

Vertebra of Codfish in the Holderness Gravels.—A vertebra from the glacial gravels at Kelsey Hill, found by Mr. George Sheppard, has been kindly identified by Mr. E. T. Newton, F.R.S., as that of a cod-fish. This is an addition to the fauna from this deposit, though the species has been recorded from the pre-glacial beach at Sewerby.—T. SHEPPARD.

SOME NEW BOOKS ON EVOLUTION.

The recent commemoration of the Centenary of the birth of Charles Darwin, and of the fiftieth anniversary of the publication of *The Origin of Species* has resulted in the appearance of a number of treatises on Evolution, some of which have already been noticed in these columns.

To the Cambridge University Press, however, is due the credit of producing the most valuable, most complete, and we may say the most generally interesting volume. It is entitled **Darwin and Modern Science,** and is edited by **Prof. A. C. Seward.** (595 pp., 18/- net), We should like first to record our thanks to Prof. Seward for being so instrumental in placing before the world this magnificent work ; not only has he edited the volume, but he has translated some of the articles which were written in German. *Darwin and Modern Science* is the outcome of a suggestion made by the Cambridge Philosophical Society to publish a series of essays as a record of the celebrations, and in the twenty-nine chapters contained in this volume is certainly the most authoratative and comprehensive survey of the influence of Darwin's work that has ever been made. Each essay has been specially written, and in most cases, the services of the very best person has been secured. An idea of the variety and scope of the volume can be ascertained from the following essays selected aphazard. 'The Selection Theory,' Prof. Weismann ; 'Variation,' Prof. Hugo de Vries ; 'Chas. Darwin as an Anthropologist,' Prof. Ernest Haeckel ; 'The Influence of Darwin on the Study of Animal Embryology,' Prof. Sedgwick ; 'The Value of Colour in the Struggle for Life,' Prof. Poulton ; 'Geographical Distribution of Plants,' Sir William Thiselton-Dyer ; 'Geographical Distribution of Animals,' Prof. Hans. Gadow ; 'Darwin and Geology,' Prof. Judd ; 'Mental Factors in Evolution,' Prof. C. Lloyd Morgan, and 'Evolution and the Science of Language,' by Mr. P. Giles. Amongst other contributors we find Sir Joseph D. Hooker, Prof. J. Arthur Thomson, Prof. W. Bateson, Prof. E. Strasburger, Prof. G. Schwalbe, Mr. J. G. Fraser, Prof. W. B. Scott, Prof. W. H. Scott, Prof. G. Klebs, Prof. J. Lock, Mr. Francis Darwin, Prof. Goebel, Prof. H. Höffding, Prof. G. Bouglé, the Rev. P. N. Waggett, Miss Jane Ellen Harrison, Prof. J. B. Bury, Sir George Darwin, and Mr. W. C. D. Whetham.

What could be a more fitting monument to the memory of Darwin than the collected tributes of these well-known writers ? And what could be more welcome to the professor or to the layman than this summary of the present attitude of our leaders in scientific thought with regard to Darwin's teaching ? We are glad to learn that any profits from the sale of this volume are to be handed over to a University Fund for the Endowment of biological research ; the best wish we can express is that the volume may meet with the success it deserves.

Life and Evolution, by **F. W. Headley.** Duckworth & Co., 272 pp., 5/- net. The fact that this volume has reached a second edition speaks for itself. It is the outcome of a series of lectures delivered by the author ; the style is pleasant, and the illustrations are numerous, and for the most part good, though some are rather crude. The book is in nine sections, viz., Plants and Animals ; The Sea and its Inhabitants ; Gills and Lungs ; Reptiles and their Kin ; from a Reptile to a Bird ; The Flight of Birds ; The Minds of Man and Animals ; The Struggle for Existence, and Natural Selection. The sections dealing with birds and their flight, etc., are especially complete, and seem to indicate that the author is perhaps most 'at home' with that part of the subject. The book is well produced, and is certainly very cheap.

The Transformations of the Animal World, by **Charles Depéret.** Kegan Paul, Trench, Trübner & Co., 360 pp., 5/-. We are delighted to find that the well-known International Scientific Series is to have a new lease of life, and that under the editorship of Mr. F. Legge, a further series is to be published, in uniformity with the well-known red-backed volumes which served so useful a purpose a quarter of a century ago. It is also appropriate at the present time that one of the first new volumes should deal with the evolution of the theories on evolution; and such is Mr. Depéret's book, being really the authorised translation of *Les Transformation du monde Animal.* It cannot be said that M. Depéret exaggerates or over-estimates the part Darwin played in the doctrine of evolution; and in the present work there is an unusually complete account of earlier and later workers in the same field. In his preface the editor asks, 'Does the study of fossils offer us any example of a regular chain of animal forms shewing the gradual transformation of one type into another? Or, is natural selection the only means that Nature employs to produce variations? To such questions the teaching of Darwin, as he left it, hardly suggested an answer.' The present work makes a special point of these questions.

Haeckel: His Life and Work, by **Prof. W. Bölsche.** Watts & Co., 128 pp., 6d.

The Rational Press Association has issued a new and revised edition of 'Haeckel's Life and Work,' and, as it can be obtained for six coppers, it should be widely read. It is well written, and is an education in itself. The translator, Mr. Joseph McCabe, gives an introduction and a supplementary chapter. Haeckel is a worker who has been greatly misunderstood, and a perusal of this book will do much towards giving one a better and more accurate idea of the man and his teaching.

Mendel's Principles of Heredity, by **W. Bateson.** Cambridge: The University Press, 396 pp., 12/- net.

We learn from the Preface that 'the object of this book is to give a succinct account of the discoveries in regard to Heredity made by the application of Mendel's method of research. Following a clue which his long lost papers provided, we have reached a point from which classes of phenomena hitherto proverbial for their seeming irregularity can be recognised as parts of a consistent whole. The study of Heredity thus becomes an organised branch of physiological science, already abundant in results, and in promise unsurpassed.'

Most of our readers will be familiar with the thorough manner in which Prof. Bateson does any work he takes in hand, and in the present instance it can be safely said that he has carried out the object for which the volume was written. Not only has he given a careful and detailed account of the present position of the questions of heredity as a result of the influence of Mendel's work, but he has reprinted Mendel's two papers, and has supplied a biographical notice. There is also a bibliography of papers, etc., bearing upon the subject, which exceeds three hundred entries—evidence alone of the importance of this subject in recent years. A perusal of the book convinces us of the force and truth of the author's remark that 'Had Mendel's work come into the hands of Darwin, it is not too much to say that the history of the developments of evolutionary philosophy would have been very different from that which we have witnessed.' Perhaps the most surprising feature in the volume is the extraordinary number of objects, zoological and botanical, which are referred to in connection with the theory. We find peas, barley, primulas, canaries, moths, fowls, sheep, mice, etc. The coloured illustrations of some of these objects, shewing the results of experiments, etc., are surely as nearly perfect as it is possible to make them. Those of the sweet peas and moths particularly call for comment on account of their excellence. As is the rule with publications issued by the Cambridge University Press, misprints are almost absent; but in the one item appearing under 'corrigendum,' *line* 18 should read *line* 19.

THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.

DR. WHEELTON HIND, F.R.C.S., F.G.S.

(*Continued from page 170*).

BELGIUM.

In Belgium the Visean Limestones have long been known to yield a characteristic fauna, now recognised as corresponding very perfectly with that of the Upper *Dibunophyllum* zone. In the Valley of the Meuse and Sambre, and at Clavier, these beds are succeeded by a Series of black shales, cherts, and thin limestones, which yield a characteristic Pendleside fauna. A fine section at Bioul, North-west of Dinant, shews the junction of the *Dibunophyllum* zone and Pendleside Series. The passage is a gradual one from a lithological standpoint, limestones gradually becoming replaced by shales.

The Pendleside fauna I obtained here in a short time is as follows :—

Listracanthus beyrichi.
Phillipsia sp.
Chonetes aff. *Laguessiana.*
Camarophoria papyracea.
Productus plicatus Sarres.
Spirifer bisulcata.
Athyris planosulcata.
Orbiculoidea nitida.
Lingula mytiloides.
Posidonomya membranacea.
Posidoniella laevis.
Pseudamusum fibrillosum.
Glyphioceras (too crushed to determine).
Orthoceras striolatum.
,, *scalare.*
Ostracoda in abundance.

Some few years ago I was invited by Mr. Dupont. then in charge of the Musée de l'histoire Naturelle at Brussels, to examine and report on fossils collected by officers of the Service du carte from Clavier. Among others, the following typical species occurred :—

Posidoniella laevis.
Pseudamusa fibrillosum.
Posidonomya membranacea.
Chœnocardiola footii.
Prolecanites compressus.
Glyphioceras bilingue
,, *spirale.*
Glyphioceras diadema.
Stroboceras sulcatum.
Phillipsii cf. *polleni.*

nd from shales at Vise, I determined :—

Posidonomya becheri.
Posidoniella laevis.
Pterinopecten papyraceus.

As long ago as 1881, Dr. Purves in his paper 'Sur la delinéa ur [illegible] la Constitution de l'etage honillier superieur de la Belgique,* showed that the Carboniferous Limestone of

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* Bull de l'acad. Royale de Belgique, 3rd Series, Part II., No. 12.

Belgium was succeeded by a group of beds which he subdivided :—

TERRAIN HOUILLIER.
Gres grossier d'Andenne.
Schistes et Psanimites avec mince couches de houille maigre.
Schistes a Mytilus.
Schistes et Phtanites avec *Goniatites* and *Posidonomya* passant vers le bas au calcaire impur avec Brachiopodes.
Calcaire Carbonifère.

The upper group he correlated with the Millstone Grit Series, and the lower with the Yoredale beds of the Midlands, *i.e.*, the Series now called Pendlesides.

Dr. Purves calls attention to the universal occurrence of this Series in Belgium, now known by the name Namurien, and quite recently in the Mons Coalfield, owing to the driving of exploration galleries, M. Cornet has shewn that the Series is present there.* He has found there a very large fauna containing the majority of the zonal indices on which I rely for the identification of the various sub-divisions of the Pendleside Series in England. M. Cornet includes in his list :—

Prolecanites compressus.
Posidonomya becheri.
P. membranacea.
Glyphioceras reticulatum.
,, *beyrichianum = diadema.*

and he then says, discussing the fauna as a whole : 'Telle qu'elle est, la liste qui procede montre l'homotaxie, des conches de Bandour et, par extension, de notre assise des phtanites Hia, avec le *Pendleside Series* que notre confrère anglais M. Wheelton Hind, place a la base du terrain honiller du Lancashire, etc., entre le Carbonifére inférieur et le Millstone Grit.'

In addition to the fauna, Mm. Cornet and Renevier have shewn that the flora which we knew to be associated with the Pendleside Series in the British Isles, is fully represented in Belgium.

Dr. Purves † considers the total thickness of the Namurien Series at Andenne to be 180 metres, of which Le Gres Grossier is 12 metres.

It is of equal importance to note that notwithstanding the much diminished thickness of the Pendleside Series in Belgium, as compared to the Midlands, that the majority of the zone forms are present, and we may conclude that sedimentary deposition was much more rapid in the English area than in Belgium, where the thickness of the beds agrees more nearly with that which obtains in the West of Ireland.

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* In Terrain Honilles sans hondle et sa faune dans le Bassi der Couchant de Mons ann de la Soc. Geol. de Belgique t. XXXIII. memoirs, pp. 139-152.

† Sop. Supra cit. p. 24.

GERMANY.

In Germany, probably because the Culm forms the base of the Carboniferous rocks, and that it rests on Upper Devonian with *Clymenia*, it has always been referred to as Lower Carboniferous, and even considered as the equivalent of part of the Tournaisian of Belgium. I have hinted in several publications that as the fauna was identical with that of the Pendleside Series, and also with the Namurien of Belgium, that the Culm of Westphalia and Nassau must be the representative of that Series.

Last summer, in company with two well-known geologists of this Society, Messrs. Cosmo Johns and Culpin, we had the good fortune to be conducted over the ground by Prof. Kayser, of Marburg, and to make a detailed examination of his extensive collection of fossils from the Culm.

Unfortunately, nowhere are there any extensive sections in the sequence, and there appear to have been several basins of deposit, in which the lowest bed, as indicated by its fauna, does not always appear to belong to the same zone.

Often the Culm beds repose on a Diabase of Upper Devonian age, which naturally obscures the sequence. The Diabase is intrusive in the Clymenia beds of the Upper Devonian, so that the conditions and sequence are very similar to that which obtains in Devonshire.

The beds of Culm at Breitscheid are considered to be the lowest of the Series, and they contain :—

Prolecanites compressus.
Glyphioceras crenistria.
Glyphioceras mutabile.
Pericyclus virgatas.
Brancoceras ornatissimum.
Trincoceras hibernicum.
Dimorphoceras gilbertsoni.
Orthoceras scalare.
Orthoceras cf. *salvum* de Kon
and Corals.

This is a fauna which indicates the highest Visean or *Dibunophyllum* horizon in Great Britain and Ireland with the type fossil of the passage beds between the *Dibunophyllum* zone and Pendleside Series.

The Breitscheid fossils were obtained from impersistent lenticles of limestone, and as far as I can understand, the fauna has been met with also at Erdbach and Liebstein.

The Middle Culm is more fossiliferous, and is well exposed at Herborn. The Series consist of Calcareous shales, the Posidonien Scheifer, with small nodules, resting on 7-8 metres of black chert, which itself reposes on a Diabase of Upper Devonian age. The succession is as follows :—

Grunwacke or Grit	100	200	metres.
Posidonomya becheri shales	20	25	,,
Chert	7	8	,,
Upper Devonian Diabase			

The flora and fauna of these beds is typically that of the Lower Pendleside Series, with the exception that *Pterinopecten papyraceus* has not been found there. I just mention the most important :—

Adiantites antiquus.
Glyphioceras.
Orthoceras striolatum.
Aviculopecten losseni.
Camarophoria papyracea.
Posidonomya becheri.
Orthoceras scalare (often called with us *O. Konincki*).
Actinopteria persulcata.
Listracanthus beyrichi.
and Trilobites.

This fauna has been described by Prof. V. Kœnen.

I regret to say that I did not visit the Culm of Westphalia, but thanks to Professor Kayser, I was able to study his fine collection of fossils from that area, and with his information as to the sequence, have arrived at the following results :—

Prof. Kayser's collections were from two localities—Hagen and Aprath, near Elberfeld. The general sequence is as follows :—

Flotzeere Sandstein with plants	2000	metres
Culm tonschiefer with *Glyphioceras reticulatum* ..	200	,,
Dark thin-bedded Limestones, with Hagen fauna at base	200	,,
Silicious Limestone, with Goniatites	50	,,
Cherts, with Aprath fauna		
Phtanites with *Prolecanites compressus*	5	,,
Devonian Rocks		

The Apath fauna contains a fauna typical of the very lowest of the Pendleside series.

Nomismoceras rotiforme
Trincoceras hibernicum
Pteurodyctium dechianum.
Prolecanites compressus.
Productus plicatus Sarres

and, as might be expected, the oldest facies of any fauna in the sequence.

(*To be continued*).

YORKSHIRE NATURALISTS AT MARKET WEIGHTON.

On Saturday, May 8th, the members of the Yorkshire Naturalists' Union commenced their 48th year's field work in the county by investigating the country around Market Weighton, where the wolds, dales, commons, woods, quarries and canal give that variety which is the charm of the life of the naturalist. As is usual on this Society's excursions, the weather was ideal, and the sixty members present were in every way satisfied. A pleasing feature was the number of local teachers, members of the East Riding Nature Study Association.

Photo by] **The Market Weighton Canal.** [*S. H. Smith.*

The geologists, under the leadership of Mr. J. W. Stather, examined the Goodmanham Valley, which, besides many fine physiographical features, contained sections in the Lias, Red and White Chalk, and Gravel. In the Chalk some important zonal fossils were recorded, including large specimens of *Terebratulina gracilis*. This party also paid a visit to the church at Goodmanham, on the site of which, according to Bede, the great pagan temple was destroyed by its converted priest.

The botanists were under the care of Messrs. W. Robinson, J. J. Marshall and W. Ingham. They were able to report that the moss *Dicranum undulatum* still grew in its only known station for the whole of the British Isles. Fungi were not very common, but the ordinary Morel was found, as well as *Mitrophera semilibera.* In addition, *Pluteus cervinus* and *Hypholoma fascicularis* were obtained by Mr. A. E. Peck.

The conchologists were in full force, and were under the leadership of Messrs. Taylor, Musham, Roebuck and Hutton, but they were not successful in finding *Acanthinula aculeata.*

Mr. S. H. Smith favours us with a lengthy report of the birds observed. In this he records that the nest of a missel thrush with three eggs was found in a willow tree fork, only two feet above the ground.

ARACHNIDA.—Mr. T. Stainforth writes that the following spiders, which have been identified by Mr. W. Falconer, were obtained on the route taken by the botanists, entomologists, etc. :—

Drassus lapidosus Walck.
Clubiona reclusa Camb.
,, *trivialis* L. Koch.
,, *comta* C. L. Koch.
Dictyna arundinacea Linn.
,, *uncinata* Westr.
Amaurobius fenestralis Stroem.
Theridion sisyphium Clerck.
Bathyphantes gracilis Bl.
Gongylidium rufipes Sund.
,, *dentatum* Wid.
Enidia bituberculata Wid.
Diplocephalus permixtus Camb.
**Cnephalocotes obscurus* Bl.
**Wideria cucullata* C. L. Koch.
Cornicularia unicornis Camb.
Pachygnatha degeerii Sund.
,, *clerkii* Sund.
Meta segmentata Clerck.
Epeira diademata Clerck.
Oxyptila trux Bl.
Pirata piraticus Clerck.
Tarentula pulverulenta Clerck.
Lycosa amentata Clerck.
,, *pullata* Clerck.
,, *lugubris* Walck.
Epiblemum scenicum Clerck
**Hasarius falcatus* Bl.

and the Harvestmen, *Platybunus triangularis* Herbst., and *Nemastoma lugubre* O. F. Muller. Species marked with an asterisk are additions to the East Riding List published in the 'Transactions of the Hull Scientific and Field Naturalists' Club,' Vol. IV., Part 2, 1909, pp. 87-102.

COLEOPTERA.—Mr. Stainforth writes that the following species have been identified among those taken on the excursion :—

Notiophilus biguttatus Fab.
,, *palustris* Duft.
Nebria brevicollis F.
Elaphrus riparius L.
Pterostichus madidus F.
,, *vulgaris* L.
Amara ovata F.
Anchomenus dorsalis Müll.
Bembidium lampros Herbst.
Dromius quadrinotatus Panz.
Haliplus ruficollis De G.
Laccophilus obscurus Panz.
Hyphydrus ovatus L.
**Philhydrus coarctatus* Gredl.
Creophilus maxillosus L.
Philonthus æneus Rossi.

Philonthus marginatus. F.
Stenus juno F.
„ *buphthalmus* Crav.
Necrophorus humator Goez.
Silpha opaca L.
* „ *thoracica* L.
Silpha rugosa L.
Hister unicolor L.
Aphodius luridus F.
Chrysomela staphylea L.
Melasoma populi L.
Prasocuris junci Brahm.

The most interesting of these are *Silpha thoracica,* one specimen of which was taken by Mr. E. Sawyer, and *Philhydrus coarctatus,* both additional records for the East Riding. *Melasoma populi* was very abundant. T. S

FIELD NOTES.

BIRDS.

Cream-coloured Snipe at Horncastle.—In the middle of January last, Mr. A. Hill, of Horncastle, shot, in a grass field, within 200 yards of the Horncastle Market Place, a cream-coloured Snipe, which was afterwards stuffed for Neville Lucas Calcraft, Esq., J.P., of Gautby.—J. Conway Walter, Horncastle.

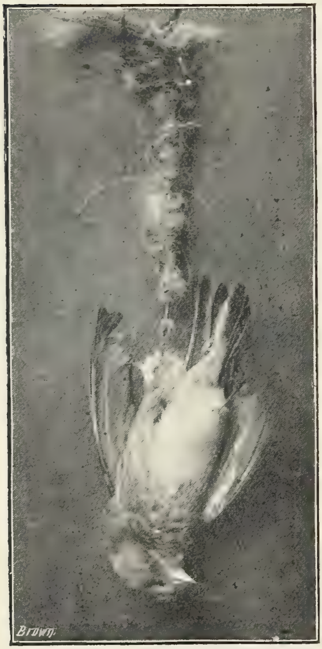


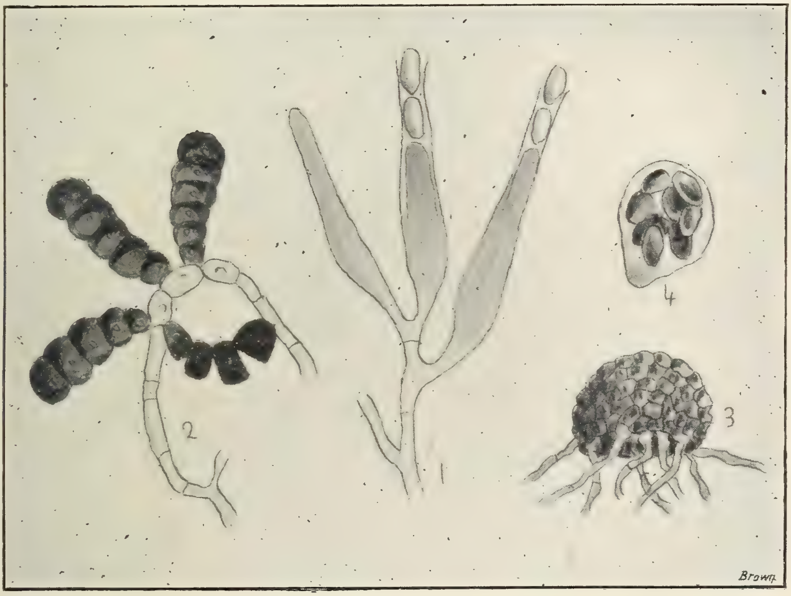
Photo by] [*R. Fortune, F.Z.S.*

Tragic Death of a Linnet.—Birds frequently meet with an untimely end through becoming entangled in their nesting materials. In the March number of 'The Naturalist,' I recorded the death of a Swift by strangulation; early this month a friend of mine noticed a Linnet flying about a patch of gorse with a lump of wool attached to its leg. A week later he was searching the same gorse when he came across the same bird, but unfortunately the wool had become entangled with the twigs near the nest, and the bird was hung head downwards quite dead. As in the case of the Swift, the bird in its struggles had turned continually in one direction, and the wool, as will be noticed in the photograph, is very tight and hard at the beginning of the twist.—R. Fortune

POLYMORPHISM IN FUNGI.*

G. MASSEE, V.M.H., ETC.,
Kew.

NOWHERE else in the Vegetable Kingdom do we meet with such sharply differentiated stages, collectively constituting an individual, as are to be met with in some groups of Fungi. Such stages of an individual are, in many instances, so markedly dissimilar in general appearance, structure, and mode of life, that in past times they were respectively looked upon as entities or species, containing an individuality of their own, and were considered as constituting distinct genera belonging to widely separated families. Numerous fungi consist of two or three such stages in their complete life-cycle, others have half-a-dozen or more.



Thielavia basicola Zopf.—1, first conidial (*Milowia*) stage ; 2, second conidial (*Torula*) stage ; 3, Perithecium or fruit of the highest or ascigerous stage ; 4, ascus containing eight spores, produced in the perithecium. Figs. 1, 2 and 4, mag. 400 times ; Fig. 3, mag. 50 times.

---

* Address delivered at the Annual Fungus Foray, held at Sandsend. See 'Naturalist,' Jan. 1909, pp. 21-29.

In many instances these different stages all grow on the same substance and at the same spot, following each other in the proper sequence. In numerous other instances, as in the rusts and mildews of cereals and other plants, different stages of the fungi grow on totally different kinds of plants, the spores or reproductive bodies of one stage being usually conveyed by wind from one host-plant to another. In other instances, insects are the agents that convey the spores produced by one stage to the place where infection is necessary to produce the following stage. This occurs, for example, in a fungus called *Sclerotinia heteroica,* one stage of which grows on the young leaves of *Vaccinium uliginosum.* The spores produced by this form of the fungus are unconsciously conveyed by insects, and deposited on the stigmas of *Ledum palustre.* It may be necessary to explain this transportation of spores on the part of insects, which is entirely due to the fact that insects, in common with other living organisms, must eat to live. The form of the fungus growing on *Vaccinium* leaves, which resembles a minute white mould, secretes a sweet, scented substance, approved of by certain small insects as food. While partaking of this food, the proboscis of the insect becomes dusted with the spores of the fungus. The flowers of *Ledum palustre* also contain something that can be utilised by the same insect, and is accordingly visited in turn. In the act of obtaining the nectar, the spores adhering to the proboscis of the insect are deposited on the stigma of the *Ledum* flower. This appears to be entirely a matter of chance, but the chance obviously happens sufficiently often to secure the continuance in fair abundance of the fungus under consideration. The spores deposited on the stigma of *Ledum* germinate quickly, grow down the style, and enter the ovary, where a dense mass of mycelium or spawn is formed. This spawn remains in a resting condition until the following spring, when it gives origin to spore-bearing bodies resembling miniature champagne glasses, supported on long stalks. The spores from these structures are dispersed by wind, and those that happen to alight on the young leaves of *Vaccinium* set up infection, which results in the production of the first mould-like condition of the fungus. What at first sight might be considered as a series of coincidences connected with the life-history of the fungus briefly detailed above, must be considered as part of the scheme of evolution and struggle for existence on the part of the fungus. Both its host-plants suffer from its attack. The *Vaccinium* has certain of its leaves more or less injured, and the *Ledum* that becomes infected loses many of its seeds without any obvious compensation. On the other hand, the fungus has so arranged the sequence and period of spore formation, that the spores borne on the *Vaccinium* host are just mature when the *Ledum* is in bloom, whereas the production of spores in the phase of the fungus parasitic on *Ledum,* are delayed until the following spring, when young *Vaccinium* leaves are present in abundance. When different stages in the life-cycle of a fungus grow on different host-plants, the term heterœcism is applied.

Now heterœcism, the most brilliant botanical discovery of the nineteenth century, made by de Bary, had its origin in what was considered as a farmer's superstition. The well-known rust of wheat—*Puccinia graminis,* had from time immemorial, been considered by farmers as in some way dependent on a fungus occurring on barberry bushes. De Bary, a celebrated German mycologist, determined to test this popular idea, and inoculated wheat plants with spores obtained from the fungus growing on the leaves of a barberry bush, and was surprised to find the well-known rust of wheat appear in due course at the points infected. Repeated experiments proved that the rust of wheat and the "cluster-cups" on barberry were stages of one and the same fungus. This discovery has led to the reduction of numerous forms, at one time considered as good species, to the condition of stages in the life-history of other species.

THIELAVIA BASICOLA.—A Yorkshire fungus, although not an example of heterœcism, includes three markedly different stages in its complete life-cycle. In fact, the three stages are structurally so distinct that they were originally placed in three different genera, which belonged respectively to three different families of the Fungi. More than half a century ago, Berkeley discovered a fungus forming black stains on the root and lower part of the stem of garden peas, and a cultivated species of *Nemophila.* To this fungus, which proved, from the standpoint of knowledge at the time, to be an undescribed species, Berkeley gave the name of *Torula basicola* (Fig. 2).

About twenty-five years ago I found a small, snow-white mould-like fungus on the base of the stem, and on the dead leaves of *Blysmus compressus* in the neighbourhood of Scarborough. This was considered as a new genus, and was called

Milowia nivea. *Milowia* was considered by Professor Saccardo as possessing such distinct characters, that he established a new tribe of the Hyphomycetes called Milowieæ, with the genus *Milowia* as the type. At a still later date, Zopf, a German botanist, discovered a black ascigerous fungus parasitic on the roots of a species of *Senecio* in Germany. This fungus proved to be new, and received the generic name of *Thielavia* (Figs. 3 and 4). Zopf observed that the fungus called *Torula basicola* was growing along with his new fungus *Thielavia*, and on cultivating the *Torula*, he found that it gave origin to the *Thielavia*, hence Zopf proved that the *Torula* was a conidial condition of his new genus *Thielavia*, which he accordingly named *Thielavia basicola*. Zopf also observed the presence of a white fungus accompanying the *Torula*, which from his description, tallied with my genus *Milowia*, but had no opportunity for growing this form. Subsequently I met with *Milowia*, and found that the spores of this form gave origin to the *Tornula* stage, the spores of which in turn, after a period of rest, produced the highest ascigerous condition of the fungus, *Thielavia basicola*.

All the three stages follow each other on the same host-plant. The two conidial forms, *Milowia* and *Torula* develop on the living plant, and are parasitic; whereas the highest ascigerous form only appears when the host-plant is dead and decayed, hence its tardy discovery.

Thielavia, in its *Torula* stage, was recently sent to Kew for determination from the neighbourhood of Doncaster, where it had destroyed a row of young peas. The fungus is recognised as a destructive parasite, on the roots of many different kinds of cultivated plants, both in Europe and in the United States.

◆

A pleasant afternoon was spent on May 15th, when a representative gathering of Curators and others interested in Museums assembled at **Burnley**, on the invitation of the Chairman and Secretary of the Burnley Art Gallery and Museum Committee. The collections are housed in the historic Towneley Hall, which, together with its excellent grounds, was purchased by the Burnley Corporation many years ago. The fine hall is a museum in itself. One room illustrates Old Burnley, and there are a few geological and archæological exhibits. Amongst the latter is a fine flint dagger, found at Burnley. It is of the rare type illustrated in this journal for July, 1908, p. 231. After tea, which was kindly provided in the Hall, various museum appliances, etc., were shewn, and papers were read on 'The Use of Illustrations in Museums,' by Mr. P. Entwistle (Liverpool) and 'Museum District Survey Work,' by Mr. S. L. Mosley (Keighley).

REVIEWS AND BOOK NOTICES.

The Genitalia of the Noctuidæ, by **F. N. Pierce, F.E.S.** Liverpool: A. W. Duncan. Price 7/6.

It is not surprising that the volume before us has been awaited for some time with considerable interest by entomologists; for, although books for students of the Lepidoptera are legion, we have never before in Britain had one treating on the branch of the subject which Mr. Pierce has made practically his own. True, we had many years ago two papers in the 'Transactions of the Linnean Society' dealing with the genitalia of the Butterflies, by Mr. P. H. Gosse and Dr. F. Buchanan White respectively, and still later in the United States of America some attention has also been paid to the genitalia of the Noctuidæ. But Mr. Pierce can fairly claim that his book makes an innovation in the methods of study of this branch of entomology so far as the lepidoptera are concerned. In some other orders the great value of the genitalia in the determination and classification of species has long been appreciated, as instance the magnificent work on the European Trichoptera by the late R. McLachlan, F.R.S.. In that order, indeed, and in the more obscure groups of the Neuroptera, species are now determined almost entirely by the structure of the genitalia, as experience has proved that they are the only characters which are different in practically every species, and at the same time constant in themselves.

We do not suppose that the genitalia will ever become as useful in the determination or classification of the lepidoptera, because in the first place, the vast majority of the species are so obviously different from each other, even in marking, shape, wing and body characters, etc., that no possible doubt about their distinctness or place in the group can exist; and in the second place, the genitalia do not appear to be by any means so infallible a guide as in the other orders we have alluded to. For instance, Mr. Pierce tells us (p. 27), that he can see no difference in the form of the genitalia of *Leucania pallens* and *L. favicolor*, except that the latter is larger. Then those of *Xylophasia polyodon*, *X. sublustris*, and *X. lithoxylea* he says (p. 41) 'are wonderfully alike.' More recently, Mr. Pierce's examination of the genitalia of the tortrices *Pœdisca nævana* and *P. geminana* showed practically no difference. Yet the differences in other respects in all these are so evident that probably every lepidopterist who knows them in the field will continue to regard them as distinct species.

On the other hand, it is clear that we have for years been regarding as single species, some, which had the genitalia been examined, would long ago have been separated into two, and in one instance, into as many as four species! This case occurs in the moth which, under the name of *Hydrœcia nictitans*, has been supposed to be abundant everywhere, and familiar to every collector. By the differences in the genitalia Mr. Pierce easily makes the four species, *nictitans*, *paludis*, *lucens* and *crinanensis* out of it. It must in fairness be said here, however, that some twenty years ago, Mr. J. W. Tutt separated to his own satisfaction, from the habits, shape, and wing markings alone, *paludis* and *lucens* from *nictitans*, a verdict in which, at the time, but few lepidopterists were willing to follow him. Examination of the genitalia, too, has settled the specific differences between *Coremia ferrugata* and *C. unidentaria*, between *Nonagria arundineta* and *N. neurica*, and between *Retinia buoliana* and *R. pinicolana*, but of which few lepidopterists had previously any doubt. On the other hand, Mr. Pierce's method seems to have settled the specific identity of *Noctua conflua* with *N. festiva*, of *Agrotis aquilina* with *A. tritici*, and *Dianthœcia capsophila* with *D. carpophaga*.

The style of the book is attractive. In the Introduction, we have a concise but clear account of the manipulation required for an examination of the genitalia, followed by an explanation of the terms used in the descriptions—some of them entirely new to the lepidopterists' vocabulary—

and illustrated by a well-executed plate representing 'Typical Male Genitalia.' Then come the descriptions, clear and intelligible, of the genitalia of the various species, under the heading of 'Classification of the Noctuidæ based on the Structure of the Male Genitalia'; and followed lastly by 32 plates containing 350 figures of the genitalia of practically all the British species of Noctuidæ. These figures are really splendid, and have evidently been most carefully drawn from the specimens. Although highly magnified, every detail is so clear, that, together with the descriptions, it should be impossible to get wrong in the examination of specimens.

We congratulate Mr. Pierce most heartily on his book, which must take a high place among entomological literature. G. T. P.

NORTHERN NEWS.

Our contributor, Mr. J. J. Burton of Nunthorpe, has been elected a Fellow of the Geological Society of London.

Amongst the recently-elected Fellows of the Royal Society we notice the names of Dr. F. A. Bather, Mr. A. J. Jukes-Browne and Prof. W. J. Lewis.

We regret to record the death of Frederick Edward Hulme, whose works on familiar wild flowers have proved such a boon to young naturalists.

Sir Thomas Henry Holland, of the Indian Geological Survey, towards the end of the year will succeed Prof. W. Boyd Dawkins, as Professor of Geology at the Manchester University.

A grant of £10 has been voted by the Caradoc and Severn Valley Field Club to Mr. H. E. Forest, the amount to go towards the publication of 'The Vertebrate Fauna of North Wales.

A series of twelve examples of *Geotrupes typhœus* from Tatton Park, shewing the development of the horns in the male, has been given to the Warrington Museum by Mr. G. A. Dunlop.

A contemporary asks 'every friendly reader' to send notes. 'Do not think anything too trivial to send. If it interests you it will probably be of general interest, and in that case will be *worthy of publication*!' Probably this explains the reason for the recently increased price of that journal.

Evidently birds sing differently in different places. Under 'Birds of *Note*' in a natural history contemporary, we were surprised to find the Gull, Eagle, Nightjar and Peregrine. The same journal is starting a column in which to record 'some of the errors in natural history, which are constantly disseminated by the press' *Et tu, Bruté!*

A Nature Study Exhibition organised by the Nature Study Society, will be held at the Royal Botanic Gardens, Regent's Park, N.W., on Friday and Saturday, June 4th and 5th. It will be open each day from 10 a.m. to sundown. It will include Aquaria, Vivaria, and other means of observing animals, with photographs and microscopic illustrations. From the report of the previous Exhibition organised by this Society, which has been sent to us, there is every probability of the forthcoming one being very successful.

At the recent Annual Meeting of the Leeds Philosophical and Literary Society it was announced that there had been a slight falling off in the attendances at the museum during the year. Nothwithstanding the fact that the fees paid for lectures was £68, as compared with £123 for the previous session, there was still a loss on the year's work of £8. The question as to the future of the Society's museum was raised, and apparently it is not yet decided whether it shall be taken over by the Corporation, or go to the University. One of the most valuable acquisitions during the year was the skeleton of a woman found in the Scoska Cave, Littondale.

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NOTES AND COMMENTS.

MEMORIES: FRANCIS GALTON.*

In his charmingly-written autobiography, Dr. Francis Galton gives many interesting glimpses into an exceedingly interesting career; and in addition, we have reminiscences of several leading men of science who have now passed away; men who were fellow-workers with Galton, but who are known to the present generation by their works alone. In many respects the life of Dr. Francis Galton reminds us of the career of our late grand Yorkshireman, Dr. Sorby; would that he, too, had left us a volume of 'Memories'! Neither Sorby nor Galton had that 'struggle for existence' which is the fate of so many scientific men, and both were thus able to devote their lives in the pursuit of science, with such excellent result.

CROTON OIL.

It is impossible in a short notice to even refer to the numerous interesting chapters dealing with travel, heredity, anthropometric research, etc., for which Dr. Galton is so well known. The book must be read to be appreciated. It is full of interesting anecdote; so much so that the present writer simply *had* to read the volume through, although work on all hands was pressing. As a sample of Dr. Galton's methods, it is worth noting that when quite a young man, engaged in medical work, he endeavoured to get a practical acquaintance of medicines by taking small doses of all that were included in the pharmacopœia, commencing at the letter 'A.' He nearly reached the end of 'C,' when he came to Croton Oil, and 'foolishly believed that two drops of it could have no notable effects as a purgative and emetic'! Apparently he took the rest of the pharmocopœia as read!

A BOOT STORY.

As illustrating the fact that different persons feel pain with different degrees of acuteness, reference is made to a native of New Zealand, where it was once the height of fashion for the Maories to wear boots 'on great occasions.' 'A youth had saved money, and went to a store a long way off, where he had purchased a pair of these precious articles. On returning home he tried to put them on, but one of his feet had a long projecting toe, which prevented it from being thrust home. He went, quite as a matter of course, to fetch a bill-hook which was at hand, and, putting his foot on a log of wood, chopped off the end of his long toe, and drew on the boot!'

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* 'Memories of My Life,' by Francis Galton, F.R.S., etc. Methuen & Co., London. 339 pp. 10/6 net.

A SEAL STORY.

In the Shetlands young seals are sometimes kept as pets. One of these came to the house of a fisherman for company, for warmth, and for food. Eventually it grew, was too big for a pet, and was troublesome to the children. 'The fisherman, sad at heart, took it with him in his boat, far away to the fishing-ground, and threw it overboard. Some days later, when the family were at supper, rather dismal at the loss of their old friend, they heard the familiar sound of scuffling and scratching, and on opening the door, in flopped the seal!'

AN IMPRESSION.

Whilst photographing lunatics, one of them, who thought himself to be Alexander the Great, was annoyed at not being photographed the first. 'When the photographer had his head well under the velvet cloth, with his body bent in the familiar attitude of photographers, whilst focusing, Alexander the Great slid swiftly to his rear, and administered a really good bite to the unprotected hinder end of the poor photographer, whose scared face emerging from under the velvet cloth rises vividly in my memory as I write this. The photographer guarded his rear afterwards by posting himself in a corner of the room.' There are many other 'impressions' in these 'Memories'!

THE DARWIN CELEBRATIONS AT CAMBRIDGE.

At the Darwin celebrations at Cambridge on June 22nd, each delegate from the Universities and learned societies was presented with a most useful and appropriate memento of the occasion. This took the form of 'The Foundations of the Origin of Species,' a sketch written in 1842 by Charles Darwin, dan edited by his son, Francis Darwin. This most valuable document accidentally came to light when the house at Down was vacated on Mrs. Darwin's death. Mr. Francis Darwin tells us that when he was at work upon '*Life and Letters*,' he had not seen it. 'The MS. was hidden in a cupboard under the stairs, which was not used for papers of any value, but rather as an overflow for matter which he did not wish to destroy.' This historic document has been printed by the Syndics of the University Press, and, together with the Editor's introduction, forms a valuable memento of a memorable event. In addition, the same publishing house has issued the 'Order of Proceedings at the Darwin Celebrations,' with a sketch of Darwin's life. It is illustrated by a number of most interesting photographs, and can be obtained at half-a-crown.

THE BOULDERS OF THE CAMBRIDGE DRIFT.

Some interesting notes on the ice-borne erratics of the Cambridge drift were recently read to the Geological Society of London, by Messrs. R. H. Rastall and J. Romanes. For several years past large numbers of boulders have been collected from the glacial drifts of Cambridgeshire, and from the post-glacial gravels which have been derived from the drifts. These specimens have been classified geographically and then subjected to a careful petrological examination, with a view to the determination of their origin. Some special collections from Hitchin and Bedford have also been included for comparison. Rocks of Scandinavian origin, and especially those of the Christiania province, are abundant throughout the whole area: such well-known types as rhomb-porphyry and nordmarkite are common. Rocks from the Cheviots and Central Scotland are more abundant than was formerly believed, and specimens have also been identified from the old red sandstone conglomerates of Forfarshire and from Buchan Ness (Aberdeenshire). Lake-District rocks probably also occur in small quantity. Much of the chalk and flints appears to be of northern origin.

BOULDER CLAYS.

It is concluded that an older boulder-clay, containing foreign erratics, the equivalent of the Cromer Till, once extended over the whole district, but was subsequently incorporated with the great chalky boulder-clay. The Scandinavian ice advanced from the direction of the Wash, bringing with it red chalk and bored *Gryphæas* from the bed of the North Sea, and carrying them as far west as Bedford. Rocks from the north of the British Isles become progressively scarcer from west to east, and the distinctive types are absent to the east of Cambridge. They appear to have been brought by an ice-stream coming from a northerly direction, which probably to a certain extent, replaced the Scandinavian ice towards the east.

In Memoriam.

THOMAS MELLARD READE, F.G.S.

We regret to record the death of one of our oldest contributors, Thomas Mellard Reade, which recently took place at his residence, Blundellsands, Liverpool, at the age of seventy-seven. Mr. Reade was a civil engineer, and in connection with his work in the Liverpool district, he had many opportunities of studying the more recent geological strata. He was a voluminous writer, there being about two hundred papers to his credit, mostly dealing with glacial and post-glacial deposits. He was one of the leading supporters of the old idea of the marine origin of Boulder clay ; probably he was one of the last to actively support that theory.

His most important treatise appeared in 1886 on ' The Origin of Mountain Ranges considered Experimentally, Structurally, Dynamically, and in Relation to their Geological History.' This was followed in 1903 by ' The Evolution of Earth Structure with a Theory of Geomorphic Changes.' He became a Fellow of the Geological Society in 1872, and was awarded its Murchison medal in 1896. He took an active interest in the Liverpool Geological Society, occupying its Presidential chair on three occasions.

T. S.

◆◆

A Survey and Record of Woolwich and West Kent. Woolwich, 1909. 526 pp.

This volume recalls the excellent handbook compiled in connection with the British Association at Glasgow a few years ago. It contains an account of the geology, botany, zoology, archæology, etc., of the Woolwich area ; the major portion being devoted to carefully-compiled lists of species of animals and plants. The original intention was that the handbook should be prepared for the twelfth annual Congress of the South-Eastern Union of Scientific Societies, held at Woolwich in 1907. Some sample pages only were ready by that time, however ; and now, nearly two years after the Congress, the handbook is ready. The delay, it seems, could not be helped, and undoubtedly the volume is much more comprehensive and complete than it would have been. The general editors are Messrs. C. H. Grinling, T. A. Ingham and the late B. C. Polkinghorne, and amongst the many contributors we notice such well-known names as W. Whitaker, A. E. Salter and J. W. Tutt. The book does not profess to be complete, and the editors ask for particulars of omissions from this ' preliminary edition.' We would like to draw attention to the omission of the ' survey of surveys, and a sketch of work waiting to be done,' said to appear in a ' final chapter.' There is a long list of errata, but it is not complete. The second word ' Additions ' should be ' Remarks ' on the heads of pp. 457-9, and 461. The indexes are particularly complete and useful, and, on the whole, the book is a valuable record.

THE PRESENT STATE OF OUR KNOWLEDGE OF CARBONIFEROUS GEOLOGY.

Dr. WHEELTON HIND, F.R.C.S., F.G.S.

(*Continued from page 231*).

The fauna obtained at Hagen contains a number of late Visean forms of Brachiopods, which are known to range throughout the Pendleside Series in England (Congleton Edge), with *Goniatites* which are generally associated with *Posidonomya becheri* in Devonshire.

Glyphioceras striatum.	*Glyphioceras crenistria.*
,, *sphœricum.*	*Orthoceras morrisianum.*

The Culm of Magdeburg has been described by D. W. Wolterstorff.* The figures of his Goniatites and lamellibranchs shew that his fossils are identical with those of the Herborn beds. I also suspect that he may have remains of a higher zone. The fossils he figures as *Dimorphoceras Törnquisti* have a strong resemblance to *Glyphioceras bilingue,* and I take the large *Goniatite* (Fig. 11), to be either *G. Phillipsi* or a large form of *G. reticulatum.* The greater part of the fauna, however, indicates the Herborn beds, probably just above the horizon of *Posidonomya becheri,* which always appears in England to have a very limited vertical distribution in the Pendleside Series.

It would, therefore, seem that the presence and persistence of the Pendleside fauna over Western Europe, and the fact that its zone fossils always succeed each other in proper sequence affords most certain and definite evidence of the correlation of the Pendleside Series and the Culm of Devonshire with the Namurien of Belgium and the Culm of Germany, but the view in Germany is that the Culm beds are of Tournaisian age, and therefore below the Viséan. Certain stratigraphical facts, with which I will now deal, are advanced in support of this view.

In 1904 Dr. Parkinson published a paper on 'The Zoning of the Culm in South Germany,'† in which he definitely makes out the Culm to be below the horizon of the Viséan.

The facts which I was shewn in the field are as follows:—In the neighbourhood of Königsberg, north of Giessen, are outcrops of a slaty breccia with some limestone, which yield the following fauna:—

---

* 'Das unter Carbon von Magdeburg Neustadt und seine fauna.'

† 'Geol. Mag.', Dec. 5, Vol. I., p. 272-276.

Productus giganteus.	*Productus punctatus.*
,, *semireticulatus.*	*Spirifer* cf. *bisulcatus.*
Orthotetes crenistria.	*Chonetes papyracea.*

CORALS AND TRILOBITES.

Cyathophyllum.	*Cyclophyllum.*
Cyathaxonia.	

i.e., a fauna of a type high up in the Viséan, totally different from any of the known Culm faunas of Germany, and in this I am in agreement with Dr. Parkinson. The stratigraphical relation of the Königsberg fauna to any of the Culm faunas is utterly unknown, no section exists which shews any connection between them. The Königsberg beds are underlaid by a Grit (grauwacke), and the Herborn beds are, on the other hand, immediately succeeded by a grauwacke, but there is not any evidence definite enough to shew that the grauwacke is the same or on a different horizon. Other outcrops of similar slaty breccias have been found in the neighbourhood of Battenberg with organic remains in a fragmentary condition, which I see no reason to think are other than on the horizon of the Königsberg beds. Now the whole district is much disturbed and overthrusts are many, and the Königsberg beds themselves are much contorted and broken, so that little inference can be drawn from small isolated sections. Stratigraphical evidence being wanting, the key to this problem must be sought elsewhere where the faunal succession is well known. It is true that in the neighbourhood of Königsberg, 400 yards east of village, we find a succession from above downwards of *Posidonomya* beds, Chert, Diabase, Upper Devonian, and that when these beds are cut off by a fault, a section shews a grauwacke, on which lies a slaty breccia with limestone containing the Visean fauna.

The Culm fauna has never yet been found to occur elsewhere below a true Visean fauna. It is a definite, distinctive, and characteristic fauna, unknown at any Carboniferous horizon except immediately succeeding the Visean or Upper *Dibunophyllum* zone.

It is most interesting to know that there are traces of a Visean fauna in South Germany, which have been preserved amid the upheavals and shatterings that the rocks have undergone since deposition, and that contemporary volcanic action, though interfering largely with the deposition of Viséan rocks, did not wholly prevent the establishment of a Viséan fauna in that area.

It is argued that the latter series cannot be below the *Posidonomya* Cherts, because there is not room for them between the Devonian Diabase and the cherts, but it is forgotten that the lowest Culm fauna, *i.e.*, the Erdbach Breitscheid or *Prolecanites compressus* fauna, which is admitted to be below the *Posidonomya* beds, is absent, and that consequently the lowest member of the sequence is absent at Königsberg.

Now the Viséan fauna of Königsberg is that which is always found to immediately precede the *Prolecanites compressus* beds, and would only be a few feet below it, and I should expect to find indications of both faunas in the same locality. The question is one therefore that could only be settled by an appeal to palæontology in such a disturbed area, especially when volcanic activity played a large part in conditioning the deposition of the series.

Two points are of interest, *i.e.*, first, the question of the relation of the Upper Devonian beds to the Culm is identical for Devonshire and Germany, and I think that the key to this question will be found in Belgium ; second, that the closing of *Dibunophyllum* times, and the ushering in of the Pendleside type was accomplished in Great Britain with much volcanic interference both in the Midlands and South Devonshire.

THE MILLSTONE GRIT.

The Millstone Grit requires very careful study at the present time. The series, when present in force, is very easily recognised, and offers fine features with its weathered crags, and its shale valleys and cloughs. But the unfortunate character of the whole series is its extremely local development. It is known that in Belgium its representative, the Grès grossier of Andenne, is only 12 metres thick ; that in the West of Ireland the series is about 300 feet, and in Scotland 687 feet, mostly shales ; while in Lancashire the whole series is very rapidly expanded into more than 3000 feet. The local variation in thickness of the series is well seen in North Staffordshire, where the Grits on the Cheshire border at Mottram are 2700 feet thick, but in the course of 20 miles south, the whole series is only represented by 300 feet of Grits and Shales.

North of Settle, where no representatives of the Pendleside faunas have been found above the *Dibunophyllum* zone of the Limestone, the Grits succeed immediately the Yoredale Series with a *Productus giganteus* fauna, and this is the case in Northumberland also, but in Scotland, as I have mentioned above, a peculiar fauna with *Prothyris elegans*, hitherto known only from the Coal Measures of Nebraska, U.S.A., is typical of the beds which intervene between the Upper *Dibunophyllum* beds and the Coal Measures. The Grits are the detritus of a granite country, which local distribution seems to indicate as having occupied a position to the North-East.

Many fossil horizons are known in the shales, which separate the different beds of Grit from each other. I published all the information I then had on the subject in 'The Naturalist,' 1907, pp. 17-23 and 90-99, and unfortunately I have nothing fresh to add. The Grits themselves contain plant remains, and they, however, furnish the following very important piece of evidence. The flora of the Millstone Grit is allied to the Upper or Coal Measure flora in distinction to the flora of the Pendleside Series and Carboniferous Limestone Series, which is characterised by a lower Carboniferous flora. The flora is therefore the index to the Series, and no beds should be assigned to the Millstone Grit, which are characterised by the lower flora, nor can we be always certain in the absence of the flora, whether any Grit is the representative of Millstone Grit or earlier beds; for example, the so-called Millstone Grit of Bristol probably represents in time a part of the Pendleside Series.

The Millstone Grit Series of England appears to have no fauna of its own. In the neighbourhood of Halifax we find the persistence of a late Pendleside fauna as high as the third Grit, and in the neighbourhood of Harrogate is a Calcareous Grit, the Cayton Gill beds, in which a late *Dibunophyllum* fauna seems to have reappeared.

In the Carboniferous succession of Denbighshire, the Millstone Grit is probably only represented by 100 feet of beds, including the Aqueduct Grit.

It is difficult to conceive the exact conditions under which a deposit, averaging from 500-100 feet over an extensive area, suddenly becomes enormously thick over a limited district to between 2000 and 3000 feet. Whatever it was, the cause is intimately connected with the origin of the Pendleside Series, itself a very local deposit, for the greatest thickness of the Millstone Grit coincides with the greatest thickness of the Pendleside Series.

COAL MEASURES.

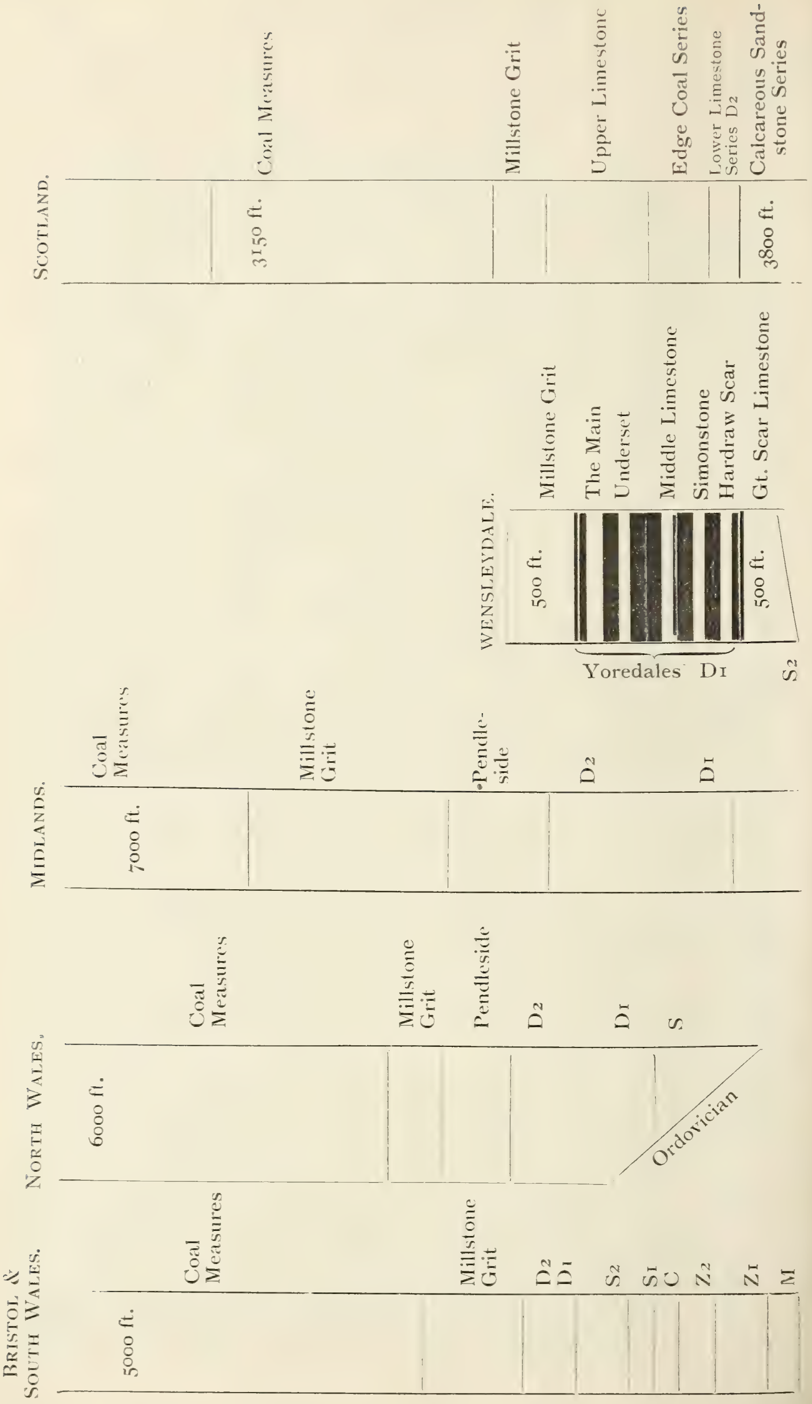
It would be a very lengthy task to enumerate all that is known of the Palæontology and Palæobotany of the various Coalfields in Great Britain and Ireland. I would claim that much more than a foundation has been laid for the accurate determination of the various life zones in the Coal Measures. In the first place the study of the distribution of plants demonstrates that it is perfectly easy to determine broadly certain main sub-divisions which are identical with the Coalfields of Western Europe, so that it may be affirmed that the flora indicates three or four phases in the 6000-7000 feet of Coal Measures.

The North Staffordshire Coalfield has been studied by local observers for many years, from a palæontological point of view, and I claim that the distribution of the fresh water Mollusca, and in a secondary way the relations of beds containing these zonal forms with intercalated marine bands, renders it possible to determine at least 16 distinct fossil horizons. The marine bands are useless by themselves, for the fauna of the various marine bands resemble each other very closely. But the series being sub-divided into the zones of *Anthracomya calcifera, A. phillipsi, A. wardi, A. adamsi, A. williamsoni, Carbonicola robusta,* a definite marine band occurring above or below one or other of them gives valuable information as to other horizons,

I claim as far as the North Staffordshire Coalfield is concerned that the Coal Measures have been definitely zoned, and am glad to know that work on similar lines in other Coalfields is revealing a practically identical palæontological sequence to that which is found to obtain in North Staffordshire.

I think that it can now be claimed that we know fairly well the local variations of the Carboniferous succession, as expressed in Western Europe, and that in our own country each province of the Carboniferous Series has been zoned by its fossils. The main question now outstanding is the comparison of the different types of deposit in each area. The idea of broad and far-reaching unconformities no doubt will account for much, and these will doubtless be made out with greater ease once the life zones are well and accurately known.

The science of Palæontology is biological, and not mathematical, and we know that many factors came into play which


SCOTLAND.
Coal Measures
3150 ft.
Millstone Grit
Upper Limestone
Edge Coal Series
Lower Limestone Series D2
Calcareous Sandstone Series
3800 ft.
WENSLEYDALE.
500 ft.
Millstone Grit
The Main
Underset
Middle Limestone
Simonstone
Hardraw Scar
Gt. Scar Limestone
500 ft.
Yoredales D1
S2
MIDLANDS.
7000 ft.
Coal Measures
Millstone Grit
Pendleside
D2
D1
NORTH WALES.
6000 ft.
Coal Measures
Millstone Grit
Pendleside
D2
D1
S
Ordovician
BRISTOL & SOUTH WALES.
5000 ft.
Coal Measures
Millstone Grit
D2
D1
S2
S1
C
Z2
Z1
M

militate against the employment of biological phenomena as absolute indices of physical conditions. The question may always be raised, when it is found that a species or fauna becomes extinct about a certain horizon, did the species or fauna become extinct really or locally ? Did it migrate to some locality, and flourish long after it had ceased to exist at its original locality ? In conclusion, in working out life zones of a series of rocks, the following facts may be useful as aphorisms. In a succession of strata, where muddy conditions succeeded a pure limestone phase, it is natural to expect a change of fauna, but where two shales or limestone contain dissimilar faunas, they are probably not contemporaneous. Faunas of different bathymetric zones may be contemporaneous, though they are dissimilar.

The period of time during which a species or fauna may survive at any locality depends entirely on the conditions of environment. Hence conditions will determine the vertical extent of rocks characterised by a zonal group or species.

Dissimilar faunas may be contemporaneous. To take an example, the fresh water and marine fauna of the Coal Measures must have been in existence contemporaneously in different areas, though they never occur in the same bed.

Hence it is rarely safe to rely on single species, and the larger the group used to denote a zone, the more accurate will be the result. It is the association of a number of species at a horizon which I consider to be the important thing in zoning the Carboniferous rocks. And the first appearance of such an association of forms is obviously the most important horizon, as it points to the establishment of a new set of conditions.

◆

A Naturalist in Tasmania, by **Geoffrey Smith.** Oxford : Clarendon Press. 151 pp., 7/6 net.

With the aid of a substantial grant from the British Association, Mr. Smith paid a six months' visit to Tasmania, principally to study the fresh-water life of the island, and particularly that strange creature, the Mountain Shrimp, which seems to be a survival from Carboniferous times. During his sojourn on the island, the author made many interesting notes in reference to the fauna, flora, history and anthropology of Tasmania, which are now presented in the form of a very interesting narrative. To the student of geographical distribution the volume is essential. There are evidences of parts of the book having been hurriedly, if not carelessly written. On page 60 the word 'cushion' appears half a dozen times quite close together, and other words are unnecessarily repeated. We made a hasty reference to the page said to contain a drawing of 'the Devil by Mr. Goodchild,' only to find *Sarcophilus ursinus*, with neither hoof, horn, nor forked tail.

THE BROAD-LEAVED WOOD GARLIC OR RAMSONS.

(*Allium ursinum*).

JAS. E. McDONALD.
Stockport.

(*Continued from page 202*).

Each plant is always capable of furnishing sufficient of these roots to gain the desired effect. Adult bulbs of wood garlic have from five to six of these roots, their length averaging five or six inches, but may be as long as nine or ten inches. In addition to root hairs, three to six rootlets are given off almost at right angles from the blunt tips of the contractile roots, and form an even more effective anchorage (see fig. 10).

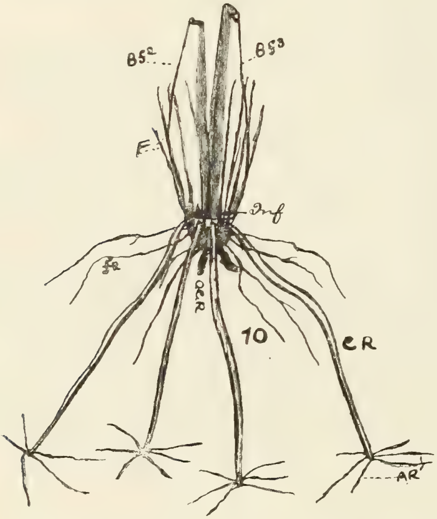


Fig. 10.—Double (twin) bulb, (partly diagrammatic), the result of development of a bulb similar to fig. 6; F, rigid fibres from previous bulb; INF, inflorescence scar; BF², and BF³, bases of leaves F² and F³ in figs. 6 and 7; CR, new contractile roots; AR, anchor rootlets; OCR, old contractile roots; FR, old fine roots.

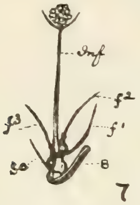
From each adult bulb two or three foliage leaves arise, and to be protected from injury by abrasion in their passage through the soil, they are covered by a closely sheathing scale-leaf until they reach the surface. At whatever reasonable depth the bulb is buried, this sheathing scale-leaf is capable of reaching the surface, when, having performed its function, it ceases to grow and quickly decays. Each scale leaf has a stiff pointed apex; the whole scale, with the enclosed leaves giving rigidity, forms a very efficient boring organ. Even from a seedling, that was buried deeper than usual, a scale leaf was found $1\frac{3}{4}$ inches in length.

The best season to notice the peculiarities of these scale leaves is during winter and early spring—say from November to March. When the surface has been reached, the leaves emerge from the sheath, and their petioles twist to reverse the position of the blade, as already described. From this time till about the end of June, they manufacture food stuffs to store in their bases. The flowers open in May and June, and by then the old bulbs have decayed; and the new ones are rapidly forming. The leaves die in July, the peduncle remaining a little while longer to allow the seeds to ripen. When the seeds have ripened and been shed the peduncle decays, and nothing of the plant is then to be seen above ground for the period of rest—four to six months.

A good mature bulb will measure from 2$\frac{1}{4}$ to 2$\frac{1}{2}$ inches in length, and be about $\frac{3}{4}$ of an inch in its broadest diameter, though the average is rather below this. A section will shew that one side is somewhat concave, and the other convex, but often with a groove running down the convex side. If examined during the resting period, they will be found somewhat as follows :—From their bases a ring of thick contractile roots grow obliquely downwards. Where these join the abbreviated stem several scars occur, one being that of the protective scale leaf of last season, the next below, that of the old bulb—from this scar a ring of rough fibres encircle the new bulb ; the uppermost circular scar is that of the outer foliage leaf of last season, and within this, on one side of the bulb, is the triangular scar of last season's peduncle ; and lastly, the new bulb itself. Near the tip of the bulb to one side is a U-shaped slit, which represents the summit of the sheathing portion of the innermost foliage leaf of last season. Every leaf is sheathing at its base, hence the circular leaf scars. The bud lies at the base inside. After growing up the tube, the new leaves and inflorescence emerge through the slit to continue their passage upwards through the soil.

In addition to multiplying by seed, there is a steady annual vegetative increase. An adult bulb often gives rise to two new ones. When this has been the case the scar of the previous inflorescence will be seen between them. These multiplying bulbs have three foliage leaves, as will be clear from the diagrams (figs. 6, 7, 10, 11). The outer of these foliage leaves (F^1) encloses the inflorescence, and another leaf (F^2)—at least while young, the other leaf (F^3) is not enclosed by (F^1). The bases of leaves F^2 and F^3 form the two new bulbs (twin bulb). against possible gnawing enemies. To my mind, they are encircling one of the new bulbs, and the inflorescence (scape) scar, but not the other bulb.

A little consideration will make it clear that the inflorescence is terminal, and that leaf F^2, and therefore its bulbous base is really the first leaf of a bud in the axil of leaf F^1. The leaf F^3 is the first of a bud from the axil of the sheathing scale that surrounds all the leaves just mentioned, as well as the inflorescence.



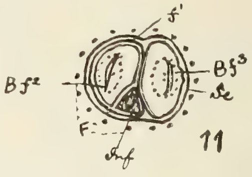


Fig. 7.—Longitudinal diagram to illustrate development of similar bulb to 6. B, bulb; SC, sheathing scale leaf; F^1, foliage leaf the base of which sheaths the inflorescence and foliage leaf F^2, but does not thicken; F^2, inner foliage leaf; F^3, foliage leaf from axil of SC; the bases of F^2 and F^3 become bulbs; INF, inflorescence.

Fig. 11.—Transverse section (diagrammatic) of fig. 10; SC, and F^1, show positions of leaves, (now scars), so lettered in figs. 6 and 7.

NOTE.—Figs. 10 and 11 are reversed in position from fig. 6.

As the short piece of axis which bears the scars and roots below the bulbs decays somewhat slowly, the two new bulbs are held by it for another year. When, as is sometimes the case, two pairs of bulbs are attached, this piece of axis has persisted two years, and above it there will be a similar piece to each pair of bulbs. The new bulbs being formed a little above the old ones, shows the necessity for an annual crop of contractile roots to pull them to the proper level, otherwise a few years would suffice to bring them to the surface. These roots are replaced chiefly whilst the new bulbs are forming — the old ones decay in June and July—and appear to perform their work during Summer and Autumn.

When the leaves are performing their functions above ground some supplementary fine thread-like roots are given off to assist in the absorption of water, etc.

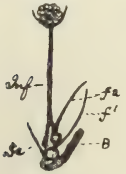
Mention has been made of the ring of rigid fibres that surround the bulbs: these are the fibres of the previous bulb remaining after the fleshy part has disappeared. They may be looked upon as an additional protection to the new bulbs against possible gnawing enemies. To my mind, they are very suggestive of the iron palisades placed around trees to prevent horses, etc., from gnawing the bark.

In several bulbs which I procured, most of the fleshy portion had been scooped out. In one of them the 'Leather-Jacket'

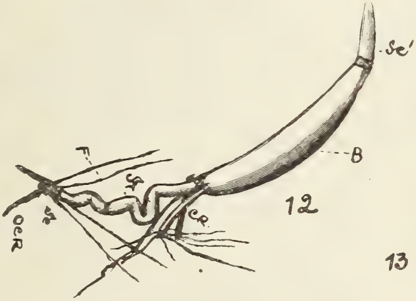
—the larva of the Crane Fly or Daddy-long-legs, was found. This greedy little monster, while in my possession, scooped out the contents of two other large bulbs—*i.e.*, the fleshy part of the bulb itself. Thus it had certainly eaten three, and most probably others previous to its capture, before an accident put an end to further depredations.

Frequently new bulbs may be found that appear to have been formed with great difficulty, probably due to such mischief as that caused by this grub to the old bulbs. In spite of so many precautions, therefore, it would seem that the wood garlic has still to fight against subtle enemies.

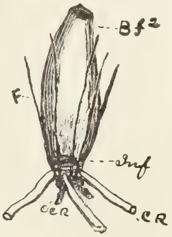
It frequently happens that when the bulbs have been buried below the average depth by miniature landslips—so common a feature in woodlands having a stream flowing through them—or with river silt, provision is made to restore the next bulb to the normal level. In these cases the otherwise short piece of axis (just sufficient to hold the various leaves—no more) becomes elongated between the sheathing scale leaf and the outer foliage leaf. Fig. 12 is an accurate sketch of a bulb having this piece of stem (an elongated solid internode) developed, though in this particular example it was formed to carry the new bulb from under a stone by which it had been accidently covered.



9



12



13

Fig. 9.—Longitudinal diagram to illustrate development of similar bulb to 8; letters as in figs 6 and 7; base of F² becomes new bulb.

Fig. 12.—A remarkable bulb. ST, solid elongated internode; SC, scar of last year's scale leaf; SC¹, new scale leaf; other letters as in previous figures.

Fig. 13.—Single bulb, the result of development of one similar to fig. 8. BF², base of leaf F² in figs. 8 and 9; other letters as in fig. 10; roots cut short.

From this sketch it will be seen that its behaviour must have been remarkably like that of a root working round obstacles in stony ground. Several others somewhat like it occurred in the same patch—a number of stones from an adjacent wall having been pushed over them. These large stones are frequently disturbed, and so many of these plants must thereby be placed in jeopardy. So long as the stones are there, examples more or less like that depicted are likely to occur. Typically, when formed expressly for the purpose of raising bulbs these elongated internodes are straight and vertical.

Amongst a number of abnormal flowers I have gathered, there have been examples with four, five, six and, in one instance even seven, lobes (carpels) to the ovary.

MUSEUM NEWS.

The **Warrington** Museum continues to issue its printed slips of ' Recent Additions,' in the April issue of which we notice that over a thousand dried plants, mostly local, have been mounted and added to the collection. There are also some useful antiquities. It would be an advantage if these lists of additions were numbered.

Mr. F. Elgee has ' edited ' [query ' written '] an official guide to the Dorman Memorial Museum, **Middlesborough** (20 pp., price not stated). It begins with a brief ' History of the Museum Movement in Middlesborough,' and includes a description of the more important exhibits. Amongst the geological specimens we notice ' two new species—*Pleuromya navicula*, and a new coral—*Isis Liassica*,' from which it would seem that the meaning of the words ' new species ' is not quite clear. An interesting exhibit is Banks' Ribbon Fish, fifteen feet long, taken at Seaton Carew in 1866. There are several illustrations from photographs, some of which would have been more useful if a scale had been shewn.

The Report of the **Colchester** Museum for 1909 (40 pp., 2d.), contains an excellent list of additions, and is illustrated by several good plates from photographs of important objects of Roman, etc., date.

A handbook to the weapons of war and the chase has been issued from the **Horniman** Museum, Forest Hill (73 pp., with plates) at the low price of 2d. The book has been written by Dr. H. S. Harrison, and edited by Prof. A. C. Haddon.

In the Report of the **Keighley** Borough Museum we learn that the number of specimens and books received by donation is [blank] *being the largest number yet received in any one year*. Mr. Mosley adds, ' last year I told you that you might make the Keighley Museum an object lesson to the country ; the above [a letter from a lady in America] not only forecasts the proof, but what it might be to the world.'

The trustees of the late A. A. Pahud, J.P., of The Limes, Westgate, **Louth,** have made a grant of £250 towards the building of a new museum for the Louth Antiquarian and Naturalists' Society.

The **Bowes** Museum at Barnard Castle was re-opened to the public on Whit Monday at 10 o'clock, and will in future be open, free, on every week-day.

The **Beverley** Corporation has adopted the Museums and Gymnasiums Act, for the benefit of its recently formed museum.

Mr. L. Fletcher, F.R.S., keeper of the Department of Mineralogy, British Museum, has been appointed Director of the Natural History Departments at **South Kensington.**

THRUSH STONES AND *HELIX NEMORALIS* L.

E. ADRIAN WOODRUFFE-PEACOCK, F.L.S., F.G.S.

(*Continued from page 174*).

The following signs require explaining. A single '[' before a formula, implies entire confluent lip banding, as $[1_{1}1_{2}3_{5}4_{2}{}_{5}$. In this shell the fifth band was absent, excepting at the lip. The sign '[U' implies the confluence of the three upper bands at the lip, as $[U(112)_{2}3_{4}4_{2}5$; a most unusual form. The sign '[L' the confluence of the two lower bands, as $[L_{11}2_{3}2_{4}5_{2}4$; this form is common enough. The sign '[UL' implies the confluence of the three upper bands together, and the confluence of the two lower together, with the third interspace clearly marked, as $[UL(112)_{3}2_{4}(425)$.

Frequently the fifth band is not the normal width below, and there are many shells which can only be indicated thus :—$1_{1}2_{2}3_{4}4_{2}[3_{2}]$. There is also a very rare shell on which the bands are not in exactly the normal position. It can be indicated thus $[{}_{0}1]_{1}1_{2}3_{4}4_{2}5$. The absence of a band is indicated by the size of the figure, as $1_{1}1_{334}3_{2}6$, where the third band was not present. There is also the production of an extra band or bands. Such forms may be recorded as—$[1_{1}2_{2}3[{}_{1}1_{1}]5_{2}5$. Much more rarely we find it thus—$[1_{1}2_{2}3[{}_{1}1_{2}]4_{2}5$, or $[1_{1}2_{2}3[{}_{1}1_{1}1_{1}]3_{2}5$. Then there is the contrast, where the band has a white interspace, as $1_{1}2_{2}[1_{1}1]_{4}4_{2}5$. All these are typical specimens from this parish.

There are two sources from which specimens may be obtained for comparing the supply furnished by any locality with those that are destroyed by the thrushes at their anvils on the spot.

The first supply is the 'dead shells'—perfect specimens—which may be found at any place frequented by *H. nemoralis* L. In the case of these specimens, as soon as I have taken off the banding and interspacing, I crush them underfoot, so as not to record them again. The second source of supply is the living molluscs, which may be obtained on the 'crawl' any damp summer evening. As one grows older and more sympathetic, I suppose, one grows more and more chary of taking life needlessly. At least, I find, I personally hate more and more the act of destroying the molluscs to preserve their shells in the county collection. So I take a vasculum out with me when I am working living shells, record the banding and interspacing on my note-sheets as I pick them up, and slip them into the tin when done with. As I return from collecting, I place them at some well-recognised spot, I never collect at—my dumping grounds, as I call them.

The relationship of colouring and banding to soils and local environment I must leave to future papers on the local records I have collected, with the help of friends. I can speak with some little experience now, as I have burnt ten thousand sheets recording one specimen each. Willingly would I have kept them for use, but as they were on five different methods of recording, I could do nothing with them. It is difficult to record shells properly on any method—to translate one method into another is beyond my wit, at least. Though the shells are destroyed, the facts they illustrated are substantiated by the notes I possess on the method suggested here.

Why *libellula* (Risso) should vary from seventy to eighty per cent. on fresh water alluvium, and be entirely absent at thrush stones in a Lincolnshire limestone quarry, I cannot say. Why there should be less *castanea* (Moq.) than either *libellula* (Risso) or *rubella* (Moq.), under all the varying circumstances, I have met with, seems inexplicable. The more you know, the more profound seem the problems which confront you. Perhaps, with the assistance of other workers, some of them may finally be solved.

It would seem, too, that there is a relationship between 'indistinct,' 'intermittent,' or 'broken banding,' and certain soils. On arid parti- or multi-coloured sea-sand banks, with little grass growth, this type of banding is unusually frequent, and seems to act as a protection to the mulluscs against their enemies. Neo-Lamarckism, or the modern evolution, would account for the prevalency of such banding in suitable localities. I know this is not the explanation generally given, but it seems to accord best with the facts which may be observed. Two quite independent matters seem to be confused by the common interpretation. First, the physical cause for broken banding first arising; and secondly, the far more important question from the evolutionists' point of view:—What has maintained it, and made it hereditary? Facts and fancy are widely distinct, but are yet allied. True science loves facts, but is ever seeking to arrange them by methods suggested by imagination, *i.e.*, co-ordinated fancy. It may only be a coincidence and nothing more between the varying forms of environment and the banding, or other peculiarities of their associated land shells. The facts would not remain inexplicable were our knowledge full enough. I will give an illustration from another shell. In a Hibaldstow limestone quarry, where *Gentiana Amarella* L. abounds the season through on the arid rock of the quarry floor, *Helix hortensis* Müller + *liliacina* (Taylor), in its dark form, may always be found in small quantities at thrush stones. When the colour of the flowers of this plant is taken into consideration, the fact is remarkable. When we know that this quarry is the only locality for this dark variety of *H. hortensis* known in Lincolnshire, and the plant is found nowhere in the same quantity and variety in size, the fact is still more remarkable.

I have no large quantity of banded shells from soils sufficiently varied, to test whether a simple formula like that I have suggested for *H. nemoralis* can be worked out for them. There is, however, a law of destruction by thrushes in the case of *H. aspersa* L., and *H. hortensis*, my notes are sufficient to prove. I must leave it to others who are interested to work out a formula and the law fully by its aid. *Helix virgata* Da Costa appears to me the most difficult banded shell we have to make a useful formula for.

◆

The Scientific Feeding of Animals, by **Prof. O. Kellner**. Duckworth & Co., 1909. 404 pp., 6/- net.

For some time there has been the need for a good treatise on the scientific feeding of animals, and we certainly consider that the publishers could not have supplied the want better than by a translation of Prof. Kellner's well-known work, which has already appeared in seven languages. Dr. W. Goodwin, of the South-Eastern Agricultural College, has made the translation, and has placed all English students and practical farmers and breeders of cattle under a deep debt of gratitude. The volume is not too technical, and is well produced.

British Birds in their Haunts, by the late **Rev. C. A. Johns.** Edited and revised by J. A. Owen. London: George Routledge, 326 pp., 7/6 net.

Notwithstanding the recent flood of ' bird " books, we can say that the present volume is one that we are glad to see, and is one of the few that we can recommend to the serious student. It is sound and thorough, and not full of the silly twaddle which most people who have a field glass and library think they can produce for the benefit of the bird-loving world. Besides much useful and reliable information about the various species, the accounts abound with interesting narrative. But the feature of the volume which will appeal to most ornithologists is the excellent series of sixty-four coloured plates, upon which there are two hundred and fifty-six figures. These are particularly faithful representations of the birds, being neither too gaily coloured, nor too clumsily drawn. Having regard to the price of the book (7/6 only), the illustrations are certainly the best of their kind that we have seen for some time, and are likely to prove most useful to the field ornithologist.

THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

Wm. WEST, F.L.S.,
AND
G. S. WEST, M.A., D.Sc., F.L.S.

(*Continued from page 193*).

After carefully considering the occurrence of *Asterionella* in the British lakes, we are compelled to agree with Wesenberg-Lund that Whipple's explanation is insufficient to explain the great maxima which occur with a considerable degree of regularity in so many of these lakes. Whipple's observations were carried out in reservoirs and in the laboratory, and not under conditions such as obtain in large lakes of considerable depth. In the first place, it is unlikely that any living individuals would exist at the bottom of a deep lake ; and assuming they did, it would be quite impossible for them to be raised up from the bottom, either by storms or convection currents, in sufficient quantities to cause an enormous maximum in the plankton. Moreover, although *Asterionella* attains its maxima in both spring and autumn, many other plankton-diatoms have only one maximum, and in some species this is attained in the winter and in others in the summer.

In stormy times, large numbers of individuals are probably carried into the plankton from the littoral region, and this doubtless accounts for the sudden maxima of certain plankton Diatoms a few days after a storm, such as in those cases recorded both by Whipple and Wesenberg-Lund.

We think, however, that the supply of plankton-recruits from the littoral region would be totally insufficient to cause the enormous maxima which occur regularly in certain plankton-species unless the other determining factors were of the most favourable nature. These determining factors would most probably be temperature, food-supply, and aëration of the water.

It would appear that temperature is a factor of importance, as the vernal and autumnal maxima occur at approximately the same water-temperature. This temperature (about 7°—8°C.), is probably the optimum for *Asterionella gracillima.* In the spring the food-supply would be at its greatest because of the large quantity of decomposed organic matter accumulated in the water. In the autumn, there would also be an increase in the available food-material due to the death and decomposition of short-lived summer forms, and also to the slight concentration of dissolved material in the water poured into the lakes. The aëration would obviously be greatest in the times of greatest disturbance of the surface-water.

It is also probable that the intense light of the summer is detrimental to any great increase of *Asterionella.*

Cyclotella compta has two maxima, one in June, and one in September, but these are not nearly so well marked as in *Asterionella.*

On the whole, most of the Diatoms attain their greatest abundance in the autumn. A few species never completely disappear from the plankton, and can be found in the living state throughout the entire year. Such are *Surirella robusta, Asterionella gracillima,* and *Tabellaria fenestrata* var. *asterionelloides.*

The characteristic var. *asterionelloides* of *T. fenestrata* was most abundant in September, with the highest water-temperature, and scarce during the cold winter months. The typical chain-form of this species with a zig-zag disposition of the frustules, which is also the normal littoral and pond form, was only observed in the plankton in the month of June. There is no evidence in this lake of any seasonal change from spring forms with a zig-zag disposition of the frustules to pelagic summer and autumn forms with star-dispositions, such as is mentioned by Wesenberg-Lund to occur in Denmark. The chain-form was not observed in the plankton until the star-dispositions were quite common, and it was only seen in that one month. It would thus appear that the var. *asterionelloides* is well established in Windermere, and that the small maximum is due solely to the multiplication of perennial colonies. Practically no variation in the frustules of these colonies was observed, the somewhat elongated proportions being very consistently maintained through the entire year.

MYXOPHYCEÆ. Of the few members of this group found in the plankton of Windermere, *Cœlosphærium Kützingianum* is the most conspicuous, attaining its greatest abundance in September (temp. 14.4°C.), in which month four out of the seven recorded species of blue-green Algæ occur.

Oscillatoria Agardhii occurs in gradually diminishing quantity from September to December (temp. 14.4°—3.2°C.).

TABLE OF PHYTOPLANKTON.

In this table the relative frequency is indicated thus :—very rare, 'rrr'; rare, 'rr'; infrequent, 'r'; fairly common, 'c'; common, 'cc'; and abundant, 'ccc.'

SPECIES.	1907.				1908.							
	September 14·4°C. (58°F.)	October 9°C. (48°F.)	November 7·2°C. (45°F.)	December 3·2°C. (38°F.)	January 1·1°C. (34°F.)	February 0·2°C. (32.5°F.)	March 0·4°C. (33°F.)	April 1·7°C. (35°F.)	May 4·4°C. (40°F.)	June 8·3°C. (47°F.)	July 11·6°C. (53°F.)	August 12·7°C. (55°F.)
CHLOROPHYCEÆ.												
Œdogonium sp. (sterile)	rrr	rrr	rrr	..	rrr	..	..	..	rr	rrr	r	rr
Microspora abbreviata (Rabenh.) Lagerh.	..	..	..	rrr								
Ulothrix zonata (Webr. & Mohr.) Kütz	..	..	..	..	..	..	..	rr				
Spirogyra sp. (sterile)	..	rrr	..	..	..	..	..	..	rrr	..	r	rrr
Cosmarium Botrytis Menegh.	rrr											
,, *subtumidum* Nordst. var. *Klebsii* (Gutw.) W. & G. S. West	c	rr	rrr	..	..	..	..	..	..	rrr	rrr	rrr
,, *depressum* (Näg.) Lund. var. *achondrum* (Boldt) W. & G. S. West	rrr											
,, *Turpinii* Bréb.	..	..	..	..	..	..	..	..	..	..	..	rrr
Xanthidium subhastiferum West var. *Murrayi* W. & G. S. West ..	c	c	c	rrr	..	..	..	..	..	..	rrr	rrr
,, *antilopæum* (Bréb.) Kütz. var. *depauperatum* W. & G. S. West	..	..	..	..	..	..	..	..	..	..	..	rrr
Arthrodesmus triangularis Lagerh. var. *subtriangularis* (Borge) W. & G. S. West	rrr											
Staurastrum paradoxum Meyen	cc	c	c	rr	rr	rrr	..	..	..	rrr	rr	r
,, ,, var. *longipes* Nordst.	r	rr	rr	rrr	rrr	..	..	..	..	rrr	rrr	r
,, *pseudopelagicum* W. & G. S. West	rrr											
,, *curvatum* West	c	cc	c	rr	rrr	..	..	rrr	rrr	rrr	rrr	rr
,, *jaculiferum* West (forma *triradiata*)	cc	c	c	r	r	..	..	rrr	rrr	rrr	rrr	rr
,, *cuspidatum* Bréb. var. *maximum* West	c	cc	r	rr	rr	..	..	..	..	..	rrr	rrr

SPECIES.	1907.				1908.							
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.
Staurastrum lunatum Ralfs var. *planctonicum* W. & G. S. West	rr	rrr	rrr	rrr	..	..	..	rrr	rrr	rrr	rrr	rr
Spondylosium pulchrum (Bail.) Arch. var. *planum* Wolle	cc	rr	rrr	..	..	rrr						
Desmidium aptogonum Bréb.	rrr											
Eudorina elegans Ehrenb.	rrr	rrr										
Pediastrum Boryanum (Turp.) Menegh.	..	..	..	..	..	rrr	..	..	..	..	rrr	rrr
,, *glanduliferum* Benn.	..	..	..	..	rrr							
Ankistrodesmus falcatus (Corda) Ralfs var. *acicularis* (A. Br.) G. S. West	rrr											
Dictyosphærium pulchellum Wood	..	rrr										
Oocystis lacustris Chodat	r	rrr										
Nephrocytium lunatum West	..	rrr										
Botryococcus Braunii Kütz.	rr	rr	..	..	..	..	..	..	..	..	..	rrr
Sphærocystis Schroeteri Chodat	r	r	rr	rrr	..	..	..	rrr	rr			
Tetraspora lacustris Lemm.	rrr	..	..	..	..	..	..	rrr				
Glœocystis gigas (Kütz.) Lagerh.	rrr	rrr	rrr									
BACILLARIEÆ.												
Melosira granulata Ralfs.	..	..	rrr	rrr	rr	r	c	cc	r			
Cyclotella compta Kütz.	r	rr	rrr	..	..	..	..	rrr	rr	r	rrr	rr
Rhizosolenia morsa W. & G. S. West	rrr	..	..	..	..	..	..	..	rr			
Tabellaria fenestrata (Lyngb.) Kütz.	..	..	..	..	..	..	..	..	..	rr		
,, ,, var. *asterionelloides* Grun.	c	r	r	rrr	rrr	rrr	rrr	rrr	rr	r	rr	rr
,, *flocculosa* (Roth) Kütz.	rrr	..	..	..	..	..	..	..	rrr	rrr	rrr	rrr
Synedra radians (Kütz.) Grun.	r											
,, *Ulna* (Nitzsch) Ehrenb.	..	..	rrr	..	..	..	..	rrr				
Asterionella gracillima Heib.	c	cc	ccc	cc	cc	r	rr	rr	ccc	ccc	rr	rr
,, *formosa* Hass.	..	..	..	..	..	..	..	rrr				
Fragilaria capucina Desmaz.	..	..	..	..	..	..	..	rrr	rr	rrr		
,, *crotonensis* (A. M. Edw.) Kitton	..	..	..	..	..	..	..	rrr				
Navicula radiosa Kütz.	..	..	rrr									
,, *viridis* Kütz.	..	..	rrr									

SPECIES.	1907.				1908.							
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.
Navicula major Kütz.	..	..	..	..	rrr	rrr	..	..	..	rrr		
Stauroneis Phœnicenteron Ehrenb.	..	..	rrr									
Cocconema cymbiforme Ehrenb.	..	..	..	..	..	..	..	..	..	rrr		
Gomphonema constrictum Ehrenb.	..	..	..	..	..	..	..	rrr				
,, *olivaceum* (Kütz.) Grun.	..	..	..	..	..	..	..	rrr				
Nitzschia Palea (Kütz.) Grun.	rrr											
Epithemia turgida (Ehrenb.) Kütz.	..	..	..	..	..	..	..	rrr				
Amphora ovalis Kütz.	..	..	..	..	..	..	..	..	..	rrr		
Surirella biseriata Bréb.	rr	rrr	rrr	rrr	rrr	rrr						
,, *robusta* Ehrenb.	r	rrr	rrr	rrr	rrr	rrr	rrr	rrr	rrr	rrr	rrr	rrr
,, ,, var. *splendida* (Ehrenb.) V. H.	rrr	rrr	rrr	rrr	rrr	rrr	..	rrr				
MYXOPHYCEÆ.												
Anabæna Lemmermannii Richter	rr	..	..	..	..	..	..	..	..	rrr	rr	rr
Oscillatoria Agardhii Gomont	rr	rr	rr	rrr								
,, *rubescens* D.C.	rrr											
,, *tenuis* Ag.	..	..	..	..	..	..	..	rrr	rrr	rrr		
Cœlosphærium Kützingianum Näg.	c	r	rr	rrr	rrr							
Microcystis pulverea (Wood) Migula.	..	..	..	..	rrr							
,, *æruginosa* Kütz.	..	..	..	..	..	..	..	..	..	..	..	rrr
FLAGELLATA.												
Synura uvella Ehrenb.	..	..	..	..	..	..	..	rr				
Mallomonas longiseta Lemm.	..	rr	r	c	rr	rr	rrr					
Dinobryon cylindricum Imhof.	..	..	..	..	..	..	..	..	rrr			
,, ,, var. *divergens* (Imhof.) Lemm.	c	rr	..	..	..	..	..	..	..	rrr		
PERIDINIEÆ.												
Ceratium hirundinella O. F. Müll.	rrr	rrr	rr	..	..	..	..	..	rrr	rrr	r	c
Peridinium Willei Huitfeldt-Kaas.	rrr	rrr	rrr	rrr	..	..	..	..	..	rrr	rr	c

Anabæna Lemmermanni was observed during the warmest period from June to September, and the development of the spores took place from July to August.

PERIDINIEÆ. The ubiquitous *Ceratium hirundinella* makes its first appearance in May, increases considerably in June and July, and is most abundant in August (temp. 12.7°C.), after which it gradually diminishes until its complete disappearance in the middle of December (consult text fig. 3). We have never found it in any great quantity in any of the English lakes, and it is always a seasonal plankton constituent with a summer maximum. The same is true of the large pools of the Midlands of England.* In the more southern continental lakes, it is a perennial constituent of the plankton,† but in the more northern lakes of Germany, Denmark, Russia, and Scandinavia, it completely disappears in the colder months, as in the British

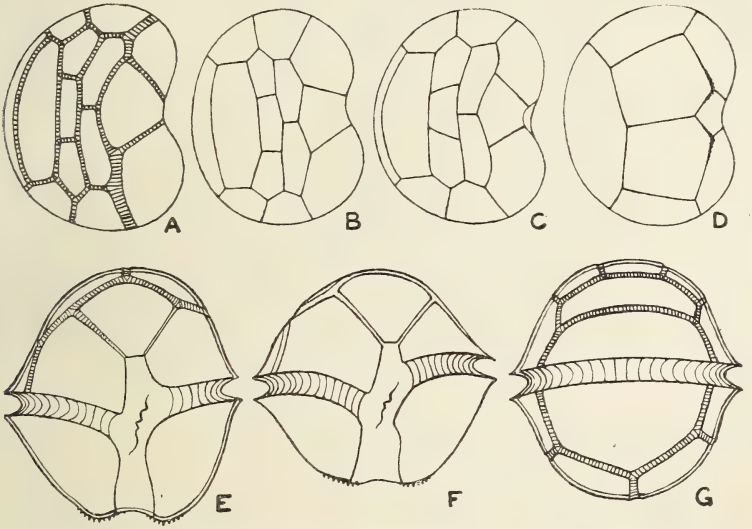


Fig. 4. *Peridinium Willei* Huitfeldt-Kaas. A.–C., epivalve of three individuals showing limits of variation in apical plates; D., hypovalve; E. and F., ventral views of two individuals; G., dorsal view. All × 500. The areolations of the plates are not indicated in the figures.

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* G. S. West, 'A Biological Investigation of the Peridinieæ of Sutton Park, Warwickshire,' New Phytologist, 1909.

† Brahm & Zederbauer, 'Beiträge zur Planktonuntersuchung alpiner Seen, II.', Verhandl. k.k. Zool.—Botan. Ges. Wien, 1904: G. Entz, 'Beiträge Kenntniss des Plankton der Balatonsees,' Result. der wiss. enforschung des Balatonsees, II. Bd. Budapest, 1904; Lemmermann in 'Archiv. für Hydrobiol. u. Planktonkunde,' III., 1908.

lakes. Careful measurements and drawings from September 1907 to August 1908 showed that no seasonal form-variation of this organism occurred in Windermere for at any rate the twelve months it was under observation, although Wesenberg-Lund* has recorded such variations in the lakes of Denmark.

The only other species of this group was *Peridinium Willei*, and the collections showed the same sudden rise in the summer months and gradual decline in the autumn as was exhibited by *Ceratium hirundinella*, the maximum being attained in August. In two Italian lakes (Lago di Varano and Lago di Monate) this species has been found by Lemmermann† to be a perennial constituent of the plankton.

FLAGELLATA. *Mallomonas longiseta* appears first in October, and as the temperature diminishes, its activity increases. It reaches its greatest abundance in December (temp. 3.2° C.) and then rapidly dies down, completely disappearing in March. It thus appears to be a cold water type, thriving during the autumnal fall in temperature.

Dinobryon cylindricum var. *divergens* has a considerable maximum in September, in which month the temperature of the water is the highest (14.4° C.). This same variety occurred in very large quantity in Derwent Water in the month of June 1903. Lemmermann has also observed it more especially in the warm period, and quite recently it has been found to attain its maximum in the hot months in an Australian lake.‡

IV.—SYSTEMATIC ACCOUNT OF THE MORE NOTEWORTHY SPECIES.

Among the various constituents of the phytoplankton of the English lakes, a number of species are of sufficient interest to merit special mention. Of the following 28 species, one is here described for the first time (*Dinobryon crenulatum*), one is new to Britain (*Elakatothrix gelatinosa*), and 13 are new to England.

CHLOROPHYCEÆ.

1. BINUCLEARIA TATRANA Wittr. in Wittr. & Nordst. Alg. Exsic. 1886, No. 715; fasc. 21, 1889, p. 18 (c fig.); G. S. West, Treatise Brit. Freshw. Alg. 1904, p. 80, fig. 25.

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* Wesenberg-Lund, *l.c.*, 1908, p. 69.

† Lemmermann in 'Archiv. für Hydrobiol. u. Planktonkunde,' III., 1908, pp. 357, 361.

‡ G. S. West in 'Journ. Linn. Soc. Bot.', XXXIX., 1909, pp. 17, 18.

This Alga occurred in a more or less fragmentary condition, in the plankton of Codale, Easedale, and Stickle Tarns. It was obviously merely washed in from the shores, and has therefore been excluded from the table of phytoplankton. It is not uncommon at the margins of subalpine tarns and lakes, especially if boggy, but is not always easy of recognition. The filaments are from 6–9 μ in diameter.

2. Gonatozygon monotænium De Bary var. pilosellum Nordst. in Wittr. & Nordst. Alg. Exsic. 1886, No. 750; fasc. 21, 1889, p. 48.

This rare variety has not previously been recorded for England. It is well characterized by the short spinate projections which replace the minute granules of the type form. The cells were 9–11 μ in diameter, and in this variety they are generally somewhat narrower than in the type, with slightly less dilated extremities. We have recorded it from the plankton of Loch Fadaghoda in the Outer Hebrides, and we have found it in other localities in Wales and Ireland.

3. Cylindrocystis diplospora Lund. var. major West in 'Journ. Linn. Soc. Bot.', XXIX., 1892, p. 131, t. 20, f. 3; W. & G. S. West in 'Journ. Roy. Micr. Soc.', 1894, p. 4, t. 1, f. 9; 'Monogr. Brit. Desm.' I., 1904, p. 61, t. 4. f. 42, 43.

This large variety was not uncommon in the plankton of Ennerdale Water. Long 125 μ; lat. 62 μ. It is known to occur in several British localities, and the first English record was from Riccall Common in East Yorkshire.

4. Micrasterias pinnatifida (Kütz.) Ralfs, 'Brit. Desm.', 1848, p. 77, t. 10, f. 3; W. & G. S. West, 'Monogr, Brit. Desm.', II., 1905, p. 80, t. 41, f. 7–11, 13.

This pretty little species is known to occur in the bogs of the Windermere drainage basin, and we have observed it sparingly in the plankton of Ennerdale Water. It appears to be confined to the old formations of the western mountainous areas of the British Islands; and in parts of the west of Ireland and north-west Scotland it is frequent in the bogs and lakes.

5. Micrasterias radiata Hass. 'Brit. Freshw. Alg.', 1845' p. 386, t. 90, f. 2 [figure bad]; W. & G. S. West, l. c., p. 113, t. 51, f. 1–9. *M. furcata* Ralfs and other authors.

Like the preceding species *M. radiata* is one of the western types of the old formations. It occurred in the plankton of Easedale Tarn, this being the first English record. Long. 187 μ; lat. 170 μ; lat. isthm. 23 μ.

(*To be continued*).

FIELD NOTES.

MAMMALS.

Porpoises in the River Hull.—Several porpoises have lately visited the River Hull. They ascended the river on Tuesday, May 17th, at 4 o'clock in the morning. As they passed under Sculcoates Bridge unsuccessful attempts were made to procure them with boat hooks. They were afterwards seen at Hull Bridge, near Beverley, still swimming up the stream. At least one got as high up the river as Hempholme Lock, and narrowly escaped being shut up in the lock-pit which it had entered, just making its exit in the nick of time. This lock is some twenty miles from the Humber, and to the knowledge of frequenters of this stream for many years, no porpoise has previously been known to ascend it. One of these enterprising animals being in a dazed condition, was caught and killed by a house-boater on the Friday, in the neighbourhood of Mikla Dike. It proved to be 48 lbs. in weight, was forty-six inches long, with a girth of twenty-five and a half inches. Its skin bore evidence of having been peppered with small shot, which, no doubt, accounted for its easy capture.—H. M. Foster, Hull.

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BIRDS.

White Wagtail in Wharfedale.—Whilst strolling along the banks of the River Wharfe at Arthington on April 6th, I was rather surprised to see two White Wagtails amongst a number of Pied Wagtails. The Pied and White Wagtails were often very near each other, and I was able with little difficulty to see the characteristic differences in the plumage between the two.—S. Hole, Leeds.

Curious Accident to a House Martin.—A House Martin in difficulties was recently discovered in the middle of the road at Harrogate. The bird was unable to fly, as a long hair had become entangled in its foot, and had then twice encircled the left wing. After the hair was removed the bird flew away. This is a sample of the many curious accidents to which birds are liable.—R. Fortune, June 11th, 1909.

Golden Oriole at Gainsborough.—On the 12th instant, walking with my daughter by the side of the Bale, a narrow wood bounding Thonock Park, on the south, we had the good fortune to see a Golden Oriole feeding on the bank between this wood and the high road. We watched it several times as it kept flying on in front of us; and in one place we got to within about a dozen yards of it before it flew away. It was very busy picking up insects from off the bank, as is its wont before the fruit time arrives.—F. M. BURTON, Highfield, Gainsborough, May 1909.

Wood Pigeon Diphtheria.—There has been great interest taken in this enquiry, although, according to the reports, Yorkshire birds seem to have escaped the contagion. I have been on two estates this April, and there the keepers seem to think the birds shot have been in good condition. Strange to say, on April 3rd, I picked up a dead Stock Dove at Eshton that had undoubtedly died of this infectious disease, its gape being one mass of cheese-like matter. Its eyes were bright, so that it had probably been dead only a day or so; the body thin, breast-bone very prominent; plumage exceptionally good.—W. H. PARKIN.

Broken Eggs under Herons Nests.—Whilst on a visit to the heronry near Gargrave on April 3rd, 1909, I again noted dropped eggs under the nests. On this occasion there were only three broken under say ten brooding birds' nests. In other years I have noted considerably more, in fact, one year it was possible to tell easily which nests were occupied by the broken egg or eggs underneath—these mostly fresh or only very slightly incubated eggs. I have always assumed that this loss was due to the indifferent platform nests. Possibly the early eggs become affected by the frost, and, on being sat, break more easily and are thrown out.—W. H. PARKIN.

Rook Law.—Referring to Mr. F. M. Burton's article in 'The Naturalist' for April; some years ago I witnessed the following occurrence, on what is known as a shard, *i.e.*, a large island in the middle of the river Lune at Lancaster.

Some two miles up the river is the village of Halton, where there is a large rookery, and from this I noticed a number of birds come flying and chattering. They settled on this shard, opposite the house I was then living in. The proceedings were almost identical with those described by Mr. Burton. The birds on alighting gathered in a circle several yards across, leaving one of their party in the centre. Silence at once ensued, and after a few seconds only, eight rooks deliberately advanced towards the bird in the centre, and quickly killed it with their beaks. It never offered to escape or defend itself. Immediately the work was done, the whole assembly rose in the air, and with loud cawings, flew back to the rookery.

I went across to the island at once, and found the bird quite dead, but warm. I could find no trace of cuts or blood.—H. B. TURNEY, Ulverston.

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FLOWERING PLANTS.

***Euphrasia Rostkoviana* Hayne—a new Yorkshire Eye=bright.**—On September 10th, 1908, I found this rare Eyebright near Warthill Station in v.c. 62. It is an addition to the flowering plants of Yorkshire. Its census number for Great Britain is 35 out of 112, and therefore it is a decidedly rare plant. It is very tall compared with the other British Eyebrights and grows scattered over waste ground.—WM. INGHAM, B.A., 14th May, 1909.

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MOSSES.

***Tortula cernua* Lindb.—A Second Yorkshire and also British habitat.**—On page 1 of 'The Naturalist' for 1901 is an account of the discovery of this new moss to the British Flora near Aberford. On May 1st, 1909, Mr. T. C. Thrupp of Doncaster sent me a specimen which he found by the side of the River Don, between Doncaster and Conisborough, in v.c. 63, and it proved to be *Tortula cernua*, and in good condition. From Mr. Thrupp's account it seems to be better established near Doncaster than at Aberford, where I understand it is scarce.—WM. INGHAM, B.A., 14th May, 1909.

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GEOLOGY.

Mammoth's Tusk at Robin Hood's Bay.—At a recent meeting of the Scarborough Field Naturalists' Society, there was exhibited a part of a Mammoth's tusk about eighteen inches in length, found in the boulder clay in the neighbourhood of Robin Hood's Bay. It had evidently had a good deal of hard wear as a 'boulder.'—D. W. BEVAN, Scarborough, May 23rd, 1909.

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NEUROPTERA.

***Libellula fulva* Mull. Re=discovered in its Old Station near Askern.**—On Whit Monday, May 31st, I took a freshly emerged Dragon-fly at Shirley Pool, near Askern. Not knowing the species, I sent it to Mr. Porritt, who identified it as *L. fulva*. Mr. S. L. Mosley recorded the species from near Askern in 1888, but from that time to the present it has been lost as a Yorkshire insect.—H. H. CORBETT, Doncaster, June 1909.

REVIEWS AND BOOK NOTICES.

The Young Beetle-Collector's Handbook, by **Dr. E. Hofmann.** With an Introduction by W. Egmont Kirby, M.D. 3rd Edition. London, Swan, Sonnenschein & Co., Ltd. 178 pp.

We can thoroughly recommend this book to the beginner in the study of the Coleoptera. For so cheap a work, the twenty coloured plates with which it is adorned are excellent. and will prove of great assistance to the young student in naming the larger species. For the smaller species, however, since these are only figured life-size, the illustrations are not quite so useful, although they will enable the tiro to identify genera. As is natural in a book of this character, little attempt is made to describe the smaller species, the greater part of the text and plates dealing with the larger beetles, which it is usually the young collector's first desire to obtain. A few of the beetles referred to are continental ; species found in Britain, although far outnumbering the continental-only forms, being distinguished by an asterisk. The letterpress, paper, arrangement and general 'get-up' of the book are commendable, and the volume is provided with an index.

Part 13 of **Wild Beasts of the World** (T. C. and E. C. Jack) contains excellent coloured plates of several of the large rmammals, including the giraffe, and the okapi.

Fossil Plants, by **E. A. Newell Arber.** Gowan and Gray, Ltd:, 1909. 75 pp., 6d. net.

This is issued as No. 21 of this firm's well-known sixpenny 'Nature Books,' and contains reproductions from sixty clear photographs of typical Carboniferous plants, together with several pages of scientific matter by Mr. Newell Arber, whose incorrect initials—E.H.—twice on the cover, seem unfamiliar. To the student of Coal Measure plants these photographs shew almost as well as do the actual hand specimens or microscope sections. They are all correctly named, and work out to more than ten a penny !

The Natural History of Igneous Rocks, by **Alfred Harker, M.A., F.R.S., London.** Methuen & Co. 384 pp., 12/6 net.

We are glad to have the opportunity of drawing attention to the excellent volume by a former member of the editorial staff of this journal, Mr. Alfred Harker. The subject has not previously been dealt with in the form Mr. Harker now presents it, viz., from a purely geological or 'natural history' standpoint. The substance of the volume was first prepared in connection with a course of lectures delivered by the author at Cambridge, and all students of petrology will welcome the information in the present readable and easily accessible form. The first portion of the book deals with igneous rocks and igneous action ; it then deals with the crystallization of igneous rock-magmas, regarded as complex solutions. In this work Mr. Harker gives the results of his life's work amongst the igneous rocks, and his descriptions are much simplified by the numerous drawings and diagrams in the text. 'The Natural History of Igneous Rocks' will certainly at once take its place in the front rank of solid contributions to the more difficult branches of geological research. We believe we have described the publishers of the work correctly, but the title is so messed up with a quite unnecessary rubber stamp, that all we can trace is 'Me . . . Co. 36 . . . W.C. ondo.'

Notes and Jottings from Animal Life by the late **Frank Buckland.** New Edition. Smith, Elder and Co. 414 pp., 3/6.

Although the title-page of this volume is dated 1909, the preface is still dated 1882. But the book is well known, and the many quaint stories of animal life are quite refreshing. The stories relate to almost every phase of life. We have had to put our copy down two or three times ; but a friend at last assured us that the type really *was* like that ! Several pages have been printed twice.

NEWS FROM THE MAGAZINES.

'Four Centuries of Legislation on Birds' is the title of a paper by Mr. W. G. Clarke in the June *Antiquary*.

In 'Notes on *Thysanoptera* (*Tubulifera*) new to the British Fauna' (*Entom. Monthly Mag.* for June), Mr. R. S. Bagnall describes *Trichothrips semicæcus* from Greatham, near Hartlepool.

The *Country Side's* year-old child, *Country Queries and Notes*, has been re-christened *Science Gossip*. The title may be the title of Science Gossip, but the voice is the voice of Country Queries and Notes.

Mr. Bernard Hobson writes an interesting and well illustrated article 'With the International Congress in Mexico,' in the number of *The Journal of the Manchester Geographical Society* recently to hand.

We learn from the *Museums Journal* that Mr. Frederick Stubbs, of Oldham, has been appointed to the restricted post of Curator in the Stepney Borough Museum. He is to work under the direction of the Borough Librarian, and be subordinate to that official.

A child in a Lancashire school was asked what was meant by 'the quick and the dead.' The answer was 'the quick is those who can get out of the way of a motor car, and the dead is those that doesn't!'—*Yorkshire Ramblers' Club Journal.*

Mr. Percival Westell has turned spring poet, and in *The Selborne Magazine* for April writes a poem, the first line of which is quite original:—'Hark! to the joyous lark!' Probably his next poem will be 'Hark to the Cuckoo!'

The 'phrases' of a Nightingale are given in a contemporary. One is 'Sososososososososo, czirhaying,' and another 'Sesesesesesesesesesese, coar o sze-oi.' The last one we heard giving forth 'phrases' like that ended up with 'rats'!

In the *New Phytologist* for April, Mr. B. M. Griffiths describes two new members of the Volvocaceæ (*Pyramimonas delicatulus* sp. n. and *Chlamydomonas* sp. n (?) from near Kidderminster, and Mr. A. W. Bartlett writes on 'An Abnormal gynœceum in *Stachys sylvatica* Linn.'

In the *Quekett Club Journal* for April, Messrs. E. Heron-Allen and A. Earland have an important paper 'On a new species of *Technitella* [*T. thompsoni*] from the North Sea, with some observations upon selective power as exercised by certain species of arenaceous foraminifera.'

A writer in the February *Zoologist* records that a Great Bustard was shot at Cloughton, near Scarborough, last Christmas, by Mr. Bennett, who 'took it home, and had it cooked instead of Turkey for Christmas dinner.' In the 'Zoologist' for March, Mr. W. H. St. Quintin points out that the 'Great Bustard' turns out to be a female Silver Pheasant.

From the cover of *The Country Side* for May 8th we learn that 'It would be an insult to the intelligence of our readers' to fill pages 'with dissertations upon such subjects as "How Plants Grow" or "The Development of the Frog."' On opening the paper the first article is found to be entitled 'How Birds Fly'! In the same issue of this journal, which professes to advocate the protection of birds, etc., is an advertisement:—'Will any reader who can procure a clutch of fresh Nightingale eggs communicate,' etc.

We notice the following modest statement in an article on Mendelism in a contemporary. 'I have not read any of the work of the scientists mentioned [Bateson, Punnet, Hurst] . . . but Mendelism seems to me to be only an elaborate and precise enunciation of principles which I have myself laid down in articles published at intervals during the last twenty years. . . . I see nothing in Mendelism which I have not been saying for many years.' We need not say who the writer is; only one man would write it. And oddly enough his work does not receive the credit he thinks it should by any of the 'scientists' quoted. In fact they do not mention his name.

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THE MUSEUM, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

J. GILBERT BAKER, F.R.S. F.L.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S.,
T. H. NELSON, M.B.O.U.,
GEO. T. PORRITT, F.L.S., F.E.S.,
JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.
RILEY FORTUNE, F.Z.S.

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NOTES AND COMMENTS.

SALMON SCALES.*

Under this title Mr. J. A. Hutton has published a most instructive lecture, which is illustrated by several plates. In this the author demonstrates that it is possible to write a fairly good account of the life history of a salmon from an examination of a single scale. Assuming that the date of the capture of the fish is known, Mr. Hutton shews that it is possible to say when the fish was hatched, when it migrated to the sea ; its subsequent travels in and out of the river ; when it spawned, etc. ; all this and more from a careful examination of the lines of growth on a scale.

A PRE-HISTORIC MAN HUNT.

In the 'Transactions of the Lincolnshire Naturalists' Union,' which will be independently noticed elsewhere, is a paper with the tempting title, 'Pre-historic Man in Lincolnshire,' by the Rev. A. Hunt, whose extraordinary contributions to Lincolnshire ethnology we have previously had occasion to refer to. He dilates upon Eolithic Man, Palæolithic Man, and Cave Man, and then we find that none of these occur in Lincolnshire ! The paper then professes to give an 'inventory of all the pre-historic remains found in the county, and we again hear, of course, of the mythical 'Pygmy Race.'

A CASE OF COURTESY.

In connection with this paper, the Curator of a certain museum (not in Lincolnshire, but close by), was asked some time ago to supply a complete list of all the pre-historic remains in his collections. The list was a lengthy one, and took some trouble to prepare, but was duly forwarded. Though apparently nearly all the information supplied is used in the lists appearing in the address, no reference whatever is made to the museum, nor to the fact that a list had been supplied. The omission is all the more pointed, seeing that the specimens in two other museums are specially indicated. As the museum in question contains, if not the finest, one of the finest collections of Lincolnshire antiquities extant, the omission can hardly be put down to ignorance. Speaking of the Brigg boat, we find Mr. Hunt writing (p. 293) that it 'is the finest specimen of a Neolithic boat yet found and preserved to us in England. *It is still to be seen in our county,* in a special shed built to preserve it near Brigg station.' Does it not seem like Fate, that, before Mr. Hunt's paper was published, this grand relic should have left the county, and have gone to that very museum that Mr. Hunt has forgotten all about ?

---

* 32 pp. and 14 plates. London : Sherratt & Hughes, 1/- net.

STONE MEMORIALS AND JACOB.

We learn in this paper that vast sheets of ice are *known as glaciers !* In a photograph of 'Early British Pottery,' there are some pieces which are certainly not early British, nor late British. The custom of raising mounds over the dead is by no means confined to 'Egypt, India, America and Britain.' Sir J. Lubbock is now Lord Avebury ; and what can anybody make of 'Incompleteness of the circle in the Barrow, points to design. Yet neither care nor trouble seem to have been spared in *their* funeral rites.' The exploded idea of bodies in barrows being buried 'facing the sun' is trotted out. Some objects are described which are certainly not pre-historic. We learn, with surprise, that neolithic people did not eat fish. Didn't the pygmies make fish-hooks ? We are correctly informed that there are over 370 barrows in England ; seeing that Yorkshire alone has yielded over double that number, and by we get to the piffle at the end, about Stone and Bronze Ages in *the Bible,* our patience is well-nigh exhausted. 'In the Beginning—*no date given*' ! ! 'There are Stone Memorials, Jacob,' etc., etc. 'Bronze translated brass is mentioned forty-five times ; Iron, four times,' and surely 'flint' is mentioned too, though we fail to see how this will help us in our 'researches.'

PROF. G. S. WEST.

We are pleased to hear that our contributor, Dr. G. S. West, son of Mr. W. West, of Bradford, has been elected to the Chair of Botany and Vegetable Physiology at the Birmingham University. We trust that Prof. West may long live to carry out the excellent work he is doing at Birmingham.

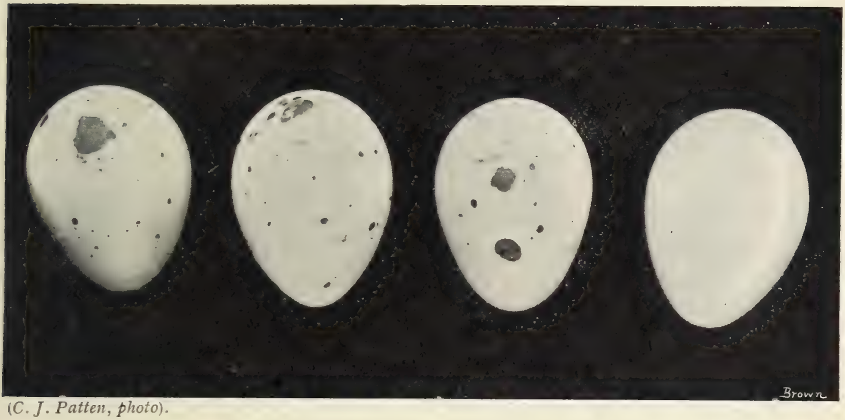
◆

The April *Bradford Scientific Journal* has an 'Introduction to the Study of Grasses,' by Dr. W. G. Smith ; 'Annelid Hunting Round Bradford,' by the Rev. H. Friend ; 'Vegetation of Some Disused Quarries,' by Mr. S. Margerison ; 'Bradford Spiders,' by Mr. W. P. Winter ; and 'The Stonechat in Yorkshire,' by Mr. E. P. Butterfield. In this last article the author contends that the species is not nearly so common as one might be led to believe from Nelson's 'Birds of Yorkshire.'

DIMORPHISM IN THE EGGS OF *TURDUS MUSICUS.*

C. J. PATTEN, M.A., M.D., Sc.D.
Sheffield.

BEING recently engaged in research into some points in avian embryology I solicited from gardeners, fruit-growers, and others, donations of eggs of some of our common species. A liberal response brought to me a number of eggs of the House-Sparrow, Blackbird and Song-Thrush, and in more limited numbers eggs of several other species. Some interesting variations in the shells came under my notice, especially in the case of the House-Sparrow and Song-Thrush. In the present paper I will deal only with the latter. I need merely give a passing notice regarding variation in size in which in three clutches each egg measured only 1·8 cm. or 7 mm. below the average as given by Saunders ('Man. Brit. Birds,' Sec. Edit., p. 4), while regarding variation in the distribution and size of the spots, I may mention that in two clutches they were exceedingly small, and wholly confined to the pointed ends.



(*C. J. Patten, photo*).

1. 2. 3. 4.

Dimorphism in the Eggs of *Turdus musicus.*

No. 4 is entirely devoid of spots. In Nos. 1, 2 and 3 the spots, and more especially the large blotches, are reddish-brown. In No. 3 there is, however, a large blackish blotch in addition. The unspotted egg (No. 4) is the longest; No. 2 comes next, both of these eggs being more pointed than the shorter ones Nos. 1 and 3. The measurements are as follows:—No. 1—2·8 cm. by 2·2 cm.; No. 2—2·9 cm. by 2·2 cm.; No. 3—2·8 cm. by 2·1 cm.; No. 4—3 cm. by 2·2 cm. It may, therefore, be observed that in breadth the eggs are practically of the one measurement.

I now wish to refer in some detail to a clutch in which one egg was entirely devoid of spots. I do not place so much importance in the discovery of a Thrush's egg without spots; it is generally known among ornithologists that such cases are by no means rare, but when the contents were examined in conjunction with the shell, some interesting points cropped up.

These I will refer to in a moment. The clutch in question, of which I give a photograph, consisted of four eggs. They were found on May 30th, 1908, in a perfectly normally-built Thrush's nest, well lined with a wall of dung, bits of rotten wood, and caked moss. The nest was built in a laurel-bush, and, when first discovered, the bird was sitting, and her identity thus secured. The off chance of the unspotted egg being that of a Starling is rendered all the more remote by the fact that Starlings were not breeding in the immediate neighbourhood, nor indeed can I find an instance of a Starling laying in a Thrush's nest. That Thrushes have laid in Blackbirds' nests is a known fact, and there is no reason to doubt that occasionally a Blackbird may take possession of a Thrush's nest. Moreover, the Blackbird has been known to lay blue unspotted eggs. In the present instance, I do not think for a moment that the egg was introduced by another bird into the nest, yet, from the observations made upon it prior to its being blown, suggestions seem to arise regarding the possibility of its being other than a member of the clutch. In measurement it is slightly longer than any of the spotted eggs, but the difference is so trivial as to call for no significance. Indeed, as may be seen from the measurements given below, all the eggs of the clutch exceed the average measurement in length. Its broadest measurement corresponds with two others of the clutch, while the remaining one is only 1 mm. narrower than these. In breadth all the eggs of the clutch may be said to attain to the average measurement laid down. But in the colour and texture of the shell, the unspotted egg, examined unblown, showed two marked peculiarities. The gloss, which was present in the spotted shells, was absent, and the texture of the shell was rougher and more porous.

The other feature attracted my attention still more, namely the difference in the ground-colour. This was much more apparent when the specimen was viewed in strong sunlight. The shell of the unspotted egg appeared lighter in shade, and of a truer blue colour than the shells of the three spotted eggs. But the latter, which shewed a slight greenish tinge, became, when blown, almost identical in shade with the unspotted shell. The reason soon became obvious, for, on blowing out the contents, I was surprised to find that the unspotted shell contained only a remarkably small and very pale yellowish-white yelk, which, amidst the mass of glary albumen was very inconspicuous. Hence the strong light, more or less transmissible through the shell, did not mingle to any extent with a rich and large yellow yelk-ball, and thereby produce a greenish effect.

I was much interested with the aborted condition of the yelk, and it further occurred to me to obtain, if possible, evidence regarding fertility. This I was enabled to do after much delicate manipulation. For the eggs were fresh, and, though the vitelline membrane gave way as the contents were being extruded, still, after a careful search which occupied several hours, I managed to secure the germinal disc, and to isolate it from the yelk in each egg. In the case of the three spotted shells, the germinal discs, which measured 4 mm. in diameter, showed evidence of fertility, for development had proceeded as far as the early indication of the embryonic shield, the primitive streak being barely visible. In the disc of the abnormal egg, there were no traces of developmental activity having taken place, and, to the best of my belief, fertilization had not ensued. Here, then, is an interesting association, viewed in its physiological aspect, between variation in shell structure, absence of the pigmental deposit from the villous membrane of the parent's uterus, an abnormally small sized yelk-ball, which was unusually light in colour, and non-fertility. That there should be any necessary association between arrested activity of the secretion of the pigmental deposit, which is not laid down until the shell is formed, and non-fertilization of the ovum itself, is not at all evident, and further investigation into the matter would be interesting.

I may conclude with a brief reference to the pigment spots on the three other eggs of the clutch. In addition to a general distribution of small circular spots, great irregularly-shaped blotches are to be seen. With the exception of the lower spot on the face of egg No. 3, they are reddish-brown in colour; indeed, these eggs, especially Nos. 1 and 2, might almost pass for that type of Ring-Ouzel's egg, which one occasionally meets with, displaying a clear bluish ground-colour with discreet brownish blotches. The difference in the black pigment spots seen on some Thrushes' eggs and the rusty reddish-brown on others, depends upon the thickness with which they are deposited. The pigment is naturally dark reddish-brown, and when laid on thinly, appears as such; a thick coating appears almost black.* In this clutch, therefore, the pigment was evidently sluggishly secreted and deposited, until after attempts were made to spot three eggs, the secretive power of the gland finally ceased, leaving one egg altogether free from spots.

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* Just as in the case of the super-posing of hundreds of coloured blood-corpuscles, straw-yellow in shade, gives one the idea of rich red blood.

1909 Aug. 1.

PLANTS ON A BRADFORD WASTE HEAP.

JOHN CRYER.

Last year on a waste heap near Bradford a very interesting series of plants was found growing luxuriantly. Most were casuals; a few were aliens. Amongst the former were *Lepidium ruderale* L., *Coronopus didymus* Sm., *Medicago denticulata* Willd., *Medicago arabica* Huds., *Carum carvi* L., *Solanum nigrum* L., *Marrubium vulgare*, L. Of the last there were two very fine plants, the principal shoot of each being two feet in height, and the lower lateral branches sixteen inches in length.

The Chenopods were well represented. In addition to *Chenopodium album* L. and its varieties, *C. viride* L. and *C. paganum* Reichb., there were fine examples of *C. opulifolium* Schrad, *C. serotinum* L., *C. Vulvaria* L., and two large beds of *C. murale* L. The grasses were also well represented by *Panicum crus-galli* L., *Setaria viridis* Beauv., *Setaria glauca* Beauv., *Polypogon monspeliensis* Desf. (in abundance), *Gastridium lendigerum* Beauv., *Festuca myuros* L. (in abundance), and *Bromus madritensis* L.

Amongst the aliens were *Carthamus tinctorius* L., with its large head of richly coloured orange-red flowers, and *Trigonella caerulea* Ser., with its rich, silky lilac flowers. Three alien grasses were *Bromus tectorum* L., *Bromus unioloides* H. B. and K., and *Deyeuxia forsthii* Kunth. = *Agrostis retro-pacta* Willd. *Agrostis retro-pacta* Willd. is not recorded in Dunn's 'Alien Flora of Britain,' nor in Druce's 'List of British Plants.'

Mr. A. Baydon Jackson, Secretary of the Linnean Society, to whom I sent a specimen, writes :—'An interesting find, as it has not been noted as an alien before in England, so far as I am aware.'

It is, I understand, a common Australian grass, and must have been brought over with wool.

◆

Erratum.—On page 253 of the July issue omit the 4th line from the bottom and read :—'This explains the scar of leaf (F^1) encircling,' etc.

A 'fine specimen of the bony sunfish' was caught at Filey on July 21st. It measured 'about 2 ft. 6 in. in length, and was almost as much across.'

We are pleased to find that Dr. A. R. Dwerryhouse, F.G.S., the President of the Geological Section of the Yorkshire Naturalists' Union, has been appointed lecturer in geology at the Queen's University, Belfast. At the same time we are sorry that this promotion means that Dr. Dwerryhouse leaves Yorkshire.

PERMIAN FOSSILS IN THE DONCASTER DISTRICT.

H. CULPIN.

The Permian rocks in the neighbourhood of Doncaster include two limestones separated by a red marl, 30 to 100 feet thick, which contains lenticular deposits of gypsum. The Upper Limestone is about 50 feet thick, and is in beds or layers, with a fossiliferous band near the top. The Lower Limestone is usually about 230 feet thick, and is a massive rock with few signs of bedding. The fossils it contains occur in great abundance near its base. Between the top of the Upper Limestone and the base of the Lower Limestone, organic remains are very rare.

The following fossils have been collected recently from these limestones in colliery shafts and railway cuttings near Doncaster. They have been named through the kindness of Dr. A. Smith Woodward, F.R.S., and are here recorded in the hope that investigation may be stimulated. The activity expected in the near future in the search for coal will provide facilities for the examination of the overlying Permian rocks which it will be a pity to let pass.

From the top of the Upper Magnesian Limestone, the specimens obtained were—*Liebea hausmanni* (Goldfuss), *Schizodus obscurus* (J. Sowerby). These occurred at Bullcroft Colliery, Carcroft, and on the Doncaster avoiding line, near Newton.

From the basement beds of the Lower Magnesian Limestone the collection included—*Liebea hausmanni* (Goldfuss) (*d*) (*e*) ; *Schizodus obscurus* (J. Sowerby) (*a*) (*b*) ; *Bakewellia antiqua* (Münster) (*a*) (*b*) (*d*) ; *Leda speluncaria* (Geinitz) (*b*) ; *Pleurophorus costatus* (Brown) (*a*) ; *Straparollus permianus* (King) (*a*) ; *Dielasma elongata* (Schlotheim) (*e*) ; *Camarophoria schlotheimi* (v. Buch) (*b*) ; *Spirifer alatus* (Schlotheim) (*b*) (*c*) ; *Lingula credneri* (Geinitz) (*b*) (*c*) ; *Productus horridus* (J. Sowerby) (*a*) (*b*) (*c*) ; *Fenestella* sp. (*b*) ; *Penniretepora* sp. (*b*).*

Some interesting references were made both by Sedgwick and by King—by the former in his 'Magnesian Limestone' ('Trans. Geol. Soc. London,' 2nd series, Vol. III., 1829) ; by the latter in his 'Permian Fossils' ('Palæontographical Society,'

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* (*a*) = Brodsworth Colliery ; (*b*) = Bentley Colliery ; (*c*) = Maltby Colliery ; (*d*) = Cadeby Cutting, Dearne Valley Railway ; (*e*) = Cutting, S.E. of Doncaster to Conisbrough Road, Dearne Valley Railway.

1850)—to the organic remains in the Magnesian Limestone rocks near Doncaster. Sedgwick pointed out their abundance, generally among the lower and more coherent beds, in the escarpments on both sides of the Don, and at Stubbs Hill and Wentbridge Hill. He stated that many casts of *Axinus* (*Schizodus*) *obscurus* occur at Wentbridge Hill in the lower beds of yellow limestone, and that it is found in a much more perfect form in the lower beds of Stubbs Hill. He mentioned more than once the beautiful small casts of a deeply striated shell, apparently *Turbo,* which occur in the pisolitic yellow limestone between Marr and Hickleton. Casts of a small smooth shell, apparently of the same genus, are rarely found, he said, in the lower beds of yellow limestone near Conisbrough.

King refers to the striated turbos as probably *Turbo mancuniensis* (p. 206), and to the smooth ones as probably *Turbo permianus* (p. 206). King also alludes to the abundance of *Schizodus obscurus* at Stubbs Hill, and states it has been collected near Elmsall (p. 190).

King's other references to the district are in regard to *Mytilus squamosus,* a specimen of which he figures from Hampole (p. 160) ; *Bakewellia antiqua* from Hampole, Stubbs Hill, and between Marr and Hickleton (pp. 169 and 170) ; *Pleurophorus costatus* from Stubbs Hill (p. 182) ; and *Dentalium sorbii,* discovered by the late Henry Clifton Sorby, from 'Connigsborough, near Doncaster' (p. 218). All these localities are on the Lower Magnesian Limestone.

BIRDS.

Crossbills at Louth.—Recently, flocks of Crossbills have been seen in the gardens on the east side of Louth. In the early morning of July 14th,* a flock of about a dozen was seen by Mr. I. Robinson, Mount Pleasant, in his garden. He obtained two of the birds—both females—one young, the other adult. The next morning he saw a flock of more than a score, and obtained another young female ; he again saw them in the afternoon of the same day. The taxidermist to whom they were taken saved one of the crops for me ; its contents consisted entirely of 'Greenfly.' Two of the birds had the lower mandible curved to its left, the other to its right.—C. S. Carter, Louth, July 17th.

---

* A few days later a fine female Crossbill was seen in a garden near Brough, E. Yorks.—Eds.

SOME BRITISH EARTHMITES.

Trombidiidæ.

C. F. GEORGE, M.R.C.S.

Johnstoniana errans.—This very remarkable mite was described by Dr. George Johnston in his 'Acarides of Berwickshire'* His description, which is accompanied by figures of the hairs of this mite on their bulbous base, one palpus, and two parts of the hind leg, is so clear and minute, that there can be no mistaking the identity of the creature. He describes it as blood red, with scarlet thorax legs and palpi; smooth to the naked eye. He points out that it is not a characteristic *Rhyncholophus*, but stands as it were between that genus and *Trombidium.* Now, dissection shews that it is nearer to *Trombidium* than to *Rhyncholophus*; for the great distinction between these two genera is, that in *Rhyncholophus* the mandibles are straight and fitted for piercing, whilst in *Trombidium* they are sickle shaped, and adapted for tearing. Figure B. is a mandible of this mite, and may be compared with that of *Trombidium holosericeum* (see page 333 of 'The Naturalist' for 1908, fig. i.).

In 'The Naturalist' for 1907, page 180, will also be found a figure of the mandibles of *Erythrœus,* which is one of the *Rhyncholophidæ,* and shews distinctly the great difference between the mandibles of the two families.

At present *Trombidium* is divided into two sub-divisions, viz., *Trombidium* and *Ottonia,* and as the specimen now being described differs so greatly from both of them, I have ventured to make it a third sub-division, which I call *Johnstoniana.* It differs from the two other sub-divisions as follows:—

(*a*) The body is longer than broad, only very slightly wider at the shoulders, the sides are straight and almost parallel, and the posterior end is widely and regularly rounded.

(*b*) There is a distinct mark of division between the body and the cephalothorax; the latter is conical, and pointed in front.

(*c*) The eyes, each of which has two ocelli, are raised on short pedicles, and situated on the upper side of the cephalothorax, but wide apart.

(*d*) The palpi, one of which is drawn much enlarged (fig. C), besides the large claw at the end of the fourth joint, have two accessory small claws. *Trombidium* has no accessory claw, and *Ottonia* only one. These accessory claws are made out with difficulty, but can best be seen by examining the palpi before the mite is mounted.

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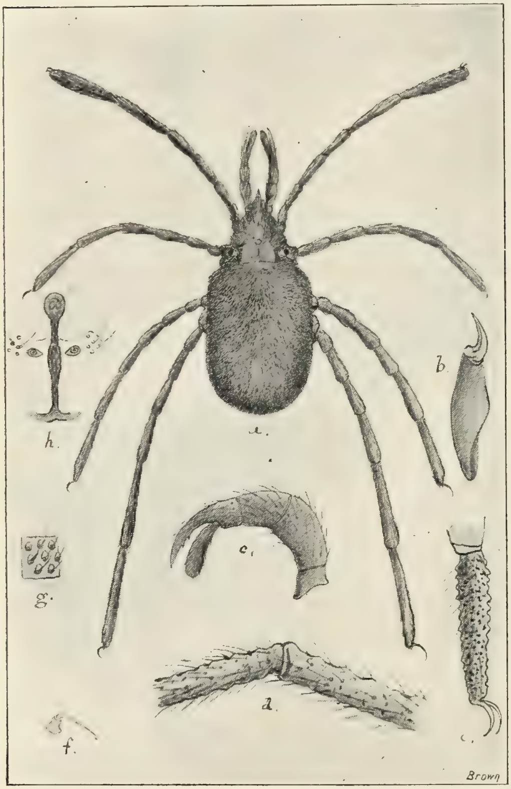
* 'The Berwickshire Naturalists' Club Transactions,' Vols. II. and III.

(*e*) The legs are altogether remarkably different from either of the other two sub-divisions. They are longer, and the hind legs are considerably longer than the others; and, instead of being more or less flattened from side to side, they are round, except where the claws are situated. They are studded with mamillary elevations irregularly situated, and having a stiff colourless curved bristle arising from their centres. Some of these are bent at right angles (figs. D, E and F); others only curved, but all point backwards. Perhaps they are best seen on the last joint of the hind leg (fig. E).

The front pair of legs are the next in length, and have the distal joint somewhat swollen, club-like. The sternite (fig. H) which is situated between the eyes, is rather short, and something like an inverted 'T,' (⊥). It has on each side, about the middle of the stem, a rather large stigma, and on the skin above are a few stiff dark-coloured spines. The upper end of the sternite is also enlarged, and has two stigmata within the enlargements. Considerable care is required to get a good mount of this organ. Mr. Evans has supplied me with three examples of this mite of different degrees of development. The last was an adult female, and contained several round and rather large red eggs. It was found in damp moss on a stone-faced fence on the road side near Edinburgh, on October 31st, 1908. There was a wood on one side, and open fields on the other. About 29 years ago I found two mites with similar legs, so that doubtless this mite is pretty widely distributed.



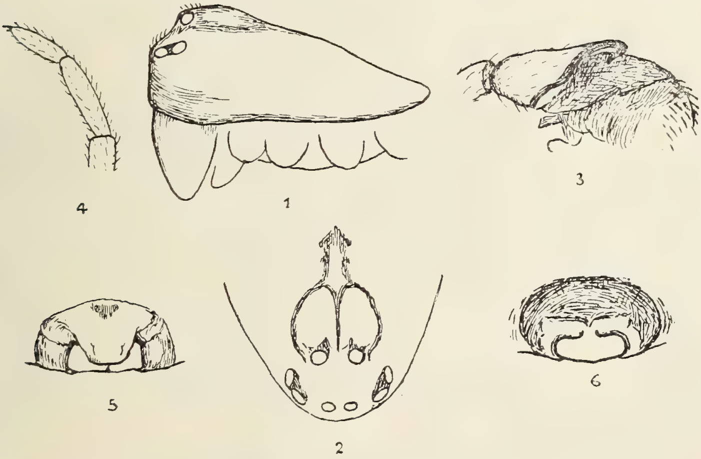
a. ***Johnstoniana errans.***
b. Mandible.
c. Palpus.
d. Portion of hind leg.
e. Last joint of hind leg.
f. Hair on mamilla bent at right angles.
g. Curved hairs on body.
h. Sternite.

NORTHUMBRIAN COAST SPIDERS.

Rev. J. E. HULL.

Unless otherwise noted, all the spiders enumerated below were collected by myself during a month's stay in the neighbourhood of North Sunderland, in September 1908. Since that time the kindness of two or three friends has enabled me to add a few names to the list, some of considerable importance. Previously, next to nothing had been done on the coast of Northumberland, for casual visits to the neighbourhood of Whitley Bay, by myself in 1896, and by Dr. Jackson a few years later, produced very meagre results. The most notable of the Whitley records was that of *Tmeticus reprobus* Cb. (then a little-known spider, and recorded by me as a new species under the name of *Tmeticus denticulatus*), and of *Erigone arctica* White, found there by Dr. Jackson in 1902, when it was new to the British list.

Of the more recent captures by far the most interesting is *Cnephalocotes incurvatus* Cb., of which two males were taken on the links opposite the Farne Islands. The type specimen (also a male) was sent to Mr. Pickard-Cambridge from Aberdeen



1. *Cnephalocotes incurvatus* Cb. ♀ —cephalothorax.
2. ,, ,, —caput, from above.
3. ,, ,, —tibia of left palpus, from within.
4. ,, ,, —tarsus and metatarsus of first pair of legs.
5. *Lophocarenum nemorale* Bl. ♀ —epigyne.
6. *Lophocarenum parallelum* Bl. ♀ —epigyne.

nearly forty years ago, and remained unique until the discovery of these Northumbrian examples. It was described in the Linnæan Society's Transactions, vol. xxvii, 1873, under the name of *Walckenaëra incurvata,* and appears in Mr. Pickard Cambridge's 1900 list as *Tapinocyba incurvata.* Since 1900, however, the limits of the genera *Tapinocyba* and *Cnephalocotes* have been better defined, and the figures now given are sufficient to show that the present spider undoubtedly belongs to the latter. It appears to lie between *Cnephalocotes curtus* Sim. on the one hand, and *C. elegans* Cb. and *C. interjectus* Cb. on the other. The elevation of the hinder part of the caput is greater than in *C. curtus,* and less than in the other two, and the tibial process of the palpus is an exaggeration of that which is found in *C. interjectus.* In the structure of the palpal tarsus, it approaches very near to *C. curtus.* Viewed from above, the occipital elevation is pretty distinctly outlined by dusky lines which at first sight give the spider the appearance of a *Tapinocyba,* the lateral lines looking very much like the furrows which are found in the males of that genus. The female is as yet unknown, but now that a definite locality is known for the species, it ought to be forthcoming shortly.

Lophocarenum nemorale Bl. is now recorded for the second time for Northumberland. In 1871 it was taken by Dr. Hardy on Cheviot Hill, and quite recently I have found both sexes in Allendale on the moors at about 1400 feet. It was quite plentiful in tidal drift between Seahouses and Beadnell, and during the present year I have received it from similar situations in the neighbourhood of Cresswell. It would seem, therefore, to have a decided preference for maritime and sub-alpine localities, though by no means unknown elsewhere. So far as I know, this is the best authenticated example among spiders of a peculiarity of distribution which is well known in other branches of natural history.

Prosthesima nigrita Th., so far as Northumberland is concerned, has a similar distribution, as the only previous record was for Cheviot.

Erigone arctica White, and *E. longipalpis* Sund. are now known to abound all along the north-east coast. They literally swarmed in the tidal drift, the former being the more abundant of the two. Both of them also occurred casually on the sandhills. These two species seem to be essentially maritime.

Lophocarenum parallelum Bl. was equally plentiful with

L. nemorale Bl. at the same time and place ; but, unlike that species, it does not appear to ascend into the hills. Its upward limit in Allendale seems to be about 700 feet.

Two other rare spiders have since been sent to me from the tidal drift—*Typhochraestus digitatus* Cb., a fine pair from the same spot as the spiders noted above (October 1908), the second occurrence of the female in the county, and the first of the male ; *Cnephalocotes elegans,* both sexes (May 1909—just through the last moult) from Cresswell, the second record of the male for Northumberland and the first of the female.

The characteristic spiders of the sandhills (as distinguished from the comparatively level links on the landward side of them) are *Clubiona phragmitis* C.L.K., *Tibellus oblongus* Wlk.. and *Trochosa picta* Hahn. Along with these are swarms of *Leptyphantes tenuis* Bl., *L. blackwallii* Kulcz., and *Meta segmentata* Clk., which, though they may be found almost anywhere, are particularly abundant among the marram grass.

Very few of the spiders occurring on the links have any claim to be considered distinctively littoral, but several species appear to flourish better there than elsewhere. Among these may be mentioned *Oonops pulcher, Pholcomma gibbum, Bolyphantes luteolus, Gongylidium apicatum, Neriene bituberculata, Tiso vagans* and *Aræoncus humilis.*

The two species of *Erigone* and *Tmeticus reprobus* Cb. are the only spiders which are exclusively maritime. The former occasionally wander to some little distance inland, but *T. reprobus* seems to be confined to the immediate neighbourhood of high water mark, where it is to be found under loose stones. It is generally distributed around the British Isles, but not yet recorded for the mainland of Europe.

The following is a list of all the species—sixty-one in number :—

Oonops pulcher Templ.
Drassus lapidosus Walck.
D. troglodytes C.L.K.
Prosthesima nigrita Sund.
Micaria pulicaria Sund.
Clubiona reclusa Cb.
C. phragmitis C.L.K.
C. diversa Cb.
C. trivialis L. K.
Agrœca proxima Cb.
Amaurobius fenestralis Str.
Textrix denticulata Oliv.
Theridion bimaculatum L.
Pholcomma gibbum Westr.
Phyllonethis lineata L.
Robertus lividus Bl.
Tapinopa longidens Wid.
Bolyphantes luteolus Bl.
Stemonyphantes lineatus L.
Linyphia clathrata Sund.
L. montana Clerck.
L. hortensis Sund.
Leptyphantes blackwallii Kulcz.
L. tenuis Bl.
L. ericæus Bl.
Bathyphantes variegatus Bl.

Pedina scopigera Grübe.
Centromerus bicolor Bl.
C. silvaticus Bl.
Tmeticus reprobus Cb.
Microneta beata Cb.
Gongylidium fuscum Bl.
G. apicatum Bl.
G. retusum Westr.
Erigone arctica White.
E. longipalpis Sund.
Tiso vagans Bl.
Typhochræstus digitatus Cb.
Lophomma herbigradum Bl.
Dicymbium nigrum Bl.
Neriene bituberculata Wid.
Gonatium rubens Bl.
G. rubellum Bl.
Savignia frontata Bl.
Aræoncus humilis Bl.
Cnephalocotes incurvatus Cb.
C. elegans Cb.
Lophocarenum nemorale Bl.
L. parallelum Bl.
Wideria antica Wid.
Walckenaëra acuminata Bl.
Cornicularia unicornis Cb.
Ceratinella brevis Wid.
Ero furcata Vill.
Meta segmentata Clerck.
M. merianæ Scop.
Pachygnatha degeerii Sund.
Xysticus cristatus Clerck.
Oxyptila trux Bl.
Tibellus oblongus Walck.
Trochosa terricola Thor.
T. picta Hahn.
Tarentula pulverulenta Clerck.
Lycosa amentata Clerck.
L. pullata Clerck.
L. nigriceps Thor.
Heliophanus flavipes Clerck.

My thanks are due to Mrs. Fletcher, North Sunderland Vicarage; to Mr. Tait, North Sunderland; and to Mr. W. Flowers, West Thirston, for spiders collected and kindly sent on to me. Also to the Rev. O. Pickard-Cambridge, for kindly confirming my identification of some of the rarer species.

Figures of *Cnephalocotes incurvatus* are here given to supplement those of Mr. Pickard-Cambridge in the Linnæan Society's Transactions, volume xxviii., plate 46, fig. 20; also of *Lophocarenum nemorale* ♀ and *L. parallelum* ♀, which are not figured in any British work, and only very imperfectly in Chyzer and Kulczynski's 'Araneæ Hungariæ.'

◆

A Short Guide to the Museum of Practical Geology, Jermyn Street, London, S.W. 48 pp. Price 1d.

Some little time ago when visiting the Jermyn Street Museum, we purchased an elaborate guide for 6d., and were much impressed with the detailed accounts of large collections, which had been removed to other museums, some miles away. This state of things has now been remedied, and we are delighted to find that the Jermyn Street Museum has brought out a carefully compiled guide at the popular price of one penny. A perusal of this is some slight indication of the wealth of the geological specimens in this institution. By the aid of this 'short guide' the visitor can at once find his way to the objects he is particularly interested in. Further help in this direction is given by the insertion of five plans.

An Official Guide to Towneley Hall, Burnley, written by Mr. John Allen, has just been issued by the Burnley Museum Sub-Committee. It is a well-illustrated account of this ancient mansion, now an attractive Art Gallery and Museum. Quite apart from its associations, there is much in Towneley Hall of interest to the artist, antiquary, or naturalist. In view of the extreme value of the Foldy's Cross, and the fact that it is one of the few of this type that are dated (1520), we certainly think that it should be placed under cover.

THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,
AND
G. S. WEST, M.A., D.Sc., F.L.S.

(*Continued from page 267*).

6. MICRASTERIAS MAHABULESHWARENSIS Hobson var. WALLICHII (Grun.) W. & G. S. West, l. c. p. 122, t. 54, f. 7, 8; t. 55, f. 1–3. *M. Wallichii* Grun.

This interesting Desmid occurred in the plankton of Grasmere. In the British Islands it was only previously known from the plankton of certain of the lochs of Scotland and the Shetland Islands, in which places it has recently been discovered. Long. 197 μ; lat. 150–165 μ; lat. isthm. 32 μ.

7. COSMARIUM CONTROVERSUM West in 'Journ. Roy. Micr. Soc.', 1890, p. 289, t. 6, f. 31 [both description and figure imperfect].

This rare species has previously been recorded from both Wales and Scotland. It occurred in the plankton of Grasmere, but was very rare. The following is an amended description of the species:—

C. submagnum, $1\frac{1}{5}$–$1\frac{1}{4}$-plo longius quam latum, profunde constrictum, sinu angusto-lineari extremo ampliato; semicellulæ pyramidato-trapeziformes, angulis basalibus rotundatis, lateribus leviter convexis, angulis superioribus rotundatis, apice late truncato; a latere visæ ovato-ellipticæ; a vertice visæ ellipticæ, tumore parvo ad medium utrobique. Membrana granulata, granulis rotundatis et uniformibus, in series obliquis decussatis 14 et series verticalibus indistinctis 18–19 (nonnunquam vix conspicuis), ad marginem semicellularum uniuscujusque granulis 30–35 visis, in centro semicellularum cum scrobiculis rotundatis conspicuis inter granulos. Pyrenoidibus binis.

Long. 90–96 μ; lat. 72–77 μ; lat. isthm. 22–32 μ; crass. 45 μ.

8. ARTHRODESMUS TRIANGULARIS Lagerh. var. SUBTRIANGULARIS (Borge) W. & G. S. West in 'Trans. Bot. Soc. Edin.', XXIII., 1905, p. 24. *A. Incus* var. *subtriangularis* Borge in 'Botaniska Notiser,' 1897, p. 212, t. 3, f. 4. *A. triangularis* var. *hebridarum* W. & G. S. West, 'Journ. Linn. Soc.', XXXV 1903, p. 542.

This characteristic plankton-variety of *A. triangularis* occurred in several of the lakes, but not in any great profusion. Long. 35–42 μ; lat. sine spin. 25–32 μ, cum spin. 77–83μ.

A most interesting form with a triangular vertical view occurred in the plankton of Easedale Tarn. This constitutes one of the connecting forms between the genera *Arthrodesmus* and *Staurastrum*. It was observed intermingled with the more usual elliptical variety, and might be called 'forma *triquetra*' (Fig. 5D).

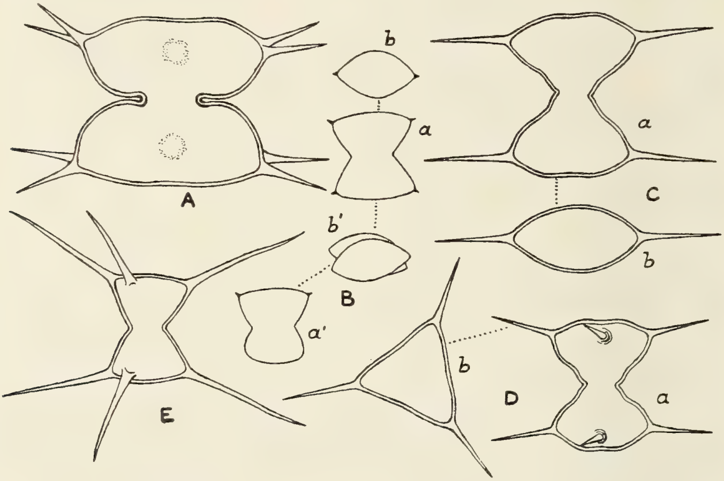


FIG. 5. A., *Xanthidium subhastiferum* West var. *Murrayi* W. & G. S. West, × 430; B., *Arthrodesmus crassus* W. & G. S. West, × 500; C., *A. triangularis* Lagerh. var. *subtriangularis* (Borge) W. & G. S. West, × 500; D., *A. triangularis* var. *subtriangularis* forma *triquetra*, × 500; E., *Staurastrum jaculiferum* West, × 500.

9. ARTHRODESMUS CRASSUS W. & G. S. West in 'Journ. Linn. Soc.', XXXV., Nov. 1903, p. 541, t. 14, f. 8, 9. *Staurastrum Sarsii* Huitfeldt-Kaas, Planktonundersögelser, I., Norske Vande, Christiania, 1906, pp. 55, 156, t. 1, f. 11–17.

This species occurred in great abundance in Ennerdale Water. Long. 19.5–23 μ; lat. (sine spin.) 19–21 μ; lat. isthm. 10 μ; crass. 11.5–13 μ. (Fig. 5 B). It appears to be a true plankton form in the British lake-areas. Huitfeldt-Kaas, who found the same Desmid in the Norwegian lakes, made the mistake of regarding the fibrillar structure of the enveloping mucus as an armature of spines.

10. XANTHIDIUM SUBHASTIFERUM West var. MURRAYI W. & G. S. West, l. c. 1903, p. 540, t. 16, f. 6.

This distinctive variety has only previously been observed from the Scottish lakes. It was abundant in Grasmere and Windermere, especially in the latter, in which it was quite a conspicuous feature of the plankton. It also occurred in Hawes Water. Long. 56–61 μ; lat. sine spin. 56–62 μ, cum spin. 92–97 μ. (Fig. 5 A).

11. STAURASTRUM ANATINUM Cooke & Wills var. LAGERHEIMII (Schmidle) nob. *St. Lagerheimii* Schmidle in Bih, till K. Sv. Vet.-Akad. Handl. Bd. 21, No. 8, 1898, t. 3, f. 10. *St. Landmarki* Huitfeldt-Kaas, l. c. 1906, pp. 54, 155, t. 2, f. 32, 33.

This variety differs only from typical *St. anatinum* in the shorter processes, which are scarcely more than half the normal length. It occurred in Ennerdale Water and in Easedale Tarn. Long. 53–65 μ; lat. cum proc. 72–88 μ. *St. anatinum* and several of its varieties occur abundantly in the British lake-plankton. The var. *Lagerheimii* is known from Norway and Northern Sweden (Finmark).

12. STAURASTRUM ARCTISCON (Ehrenb.) Lund. in Nov. Act. R. Soc. Scient. Upsala, ser. 3, VIII., 1871, p. 70, t. 4, f. 8.

This handsome Desmid appears to be very general in the British plankton, although exceedingly rare in other situations. It was particularly abundant in Brothers' Water.

13. STAURASTRUM CUSPIDATUM Bréb. var. MAXIMUM West in 'Naturalist,' Aug. 1891, p. 247; W. & G. S. West in 'Journ Linn. Soc. Bot.', XXXV., 1903, p. 545, t. 17, f. 13. *St. cuspidatum* Bréb. var. *longispinum* Lemm. in 'Botan. Centralbl. Bd.', LXXVI., 1898, p. 4 (sep.). *St. Daaei* Huitfelt-Kaas, l. c. 1906, pp. 55, 155, t. 2, f. 30, 31.

In the plankton of all the British lake-areas this large variety of *St. cuspidatum* occurs in abundance. It exhibits considerable variability in the length of the spines, although they are invariably stronger than in typical *St. cuspidatum*. Surrounding the base of each large spine is a ring of about six large pores, through each of which a short projecting piece of denser mucilage can frequently be seen extending into the surrounding and less dense gelatinous envelope. These structures are sometimes very conspicuous, and have caused Huitfeldt-Kaas to describe them as spines.

14. STAURASTRUM JACULIFERUM West in 'Journ. Linn.

Soc. Bot.', XXIX., 1892, p. 172, t. 22, f. 13; *ibid.* XXXV., 1903, p. 543, t. 17, f. 1–4.

This species is fairly general in the plankton of the English lakes, and a particularly fine form is abundant in Wastwater (Fig. 5 E). This form attained a diameter of 80 μ with the spines.

15. STAURASTRUM BREVISPINUM Bréb. forma MAJOR. Cells very large, but otherwise typical. Long. 59–63 μ; lat. 52–57 μ. This form was abundant in the plankton of Brothers' Water (Fig. 6 E). In size it approaches var. *altum* W. & G. S. West, but has not the proportions characteristic of that variety.

16. STAURASTRUM OPHIURA Lund. in Nov. Act. R. Soc. Scient. Upsala, ser. 3, VIII., 1871, No. 2, p. 69, t. 4, f. 7.

This species was only observed in the plankton of Easedale Tarn. It has been seen in no other part of the Lake District, and this is its first record for England. This is the more remarkable since *St. Ophiura* is one of the most conspicuous constituents of the Scottish and Welsh plankton. The specimens observed were 9-rayed, and had a diameter (with processes) of 142 μ.

17. SPHÆROZOSMA VERTEBRATUM Ralfs var. PUNCTULATUM W. & G. S. West in 'Trans. Bot. Soc. Edin.', XXIII., 1905, p. 28. *S. punctulatum* West in 'Journ. Bot.', Dec. 1891, t. 315, f. 1, 2.

This variety occurred in both Brothers' Water and Ennerdale Water, but was much more abundant in the latter. The cells are more angular than those of the type-form, and the punctulation of the cell-wall is a marked feature of the variety.

18. EUDORINA ELEGANS Ehrenb.

We find this member of the Volvocaceæ fairly general in the plankton of British pools and lakes. It always attains its greatest maximum in the autumn, during the decline of temperature.

Huitfeldt-Kaas (l. c. 1906, p. 36) has placed *Sphærocystis Schroeteri* in the Volvocaceæ under the name of '*Glœococcus mucosus* A. Br.', but we are inclined to think that he has confused this characteristic plankton-alga with *Eudorina elegans*. Wesenberg-Lund also believes this confusion to have taken place. We should not be surprised if Huitfeldt-Kaas had done this, as some of his other observations point to similar misconceptions. He describes the fibrillar structure of the mucous envelope of certain Desmids as 'spines.'

We would point out that the cells of the *Eudorina*-colony are arranged more closely, and much more regularly than those of *Sphaerocystis*, and that each cell frequently contains several pyrenoids. Moreover, the bases of the cilia, where they pass through the mucous envelope, can always be seen in *Eudorina*, even in badly preserved specimens.

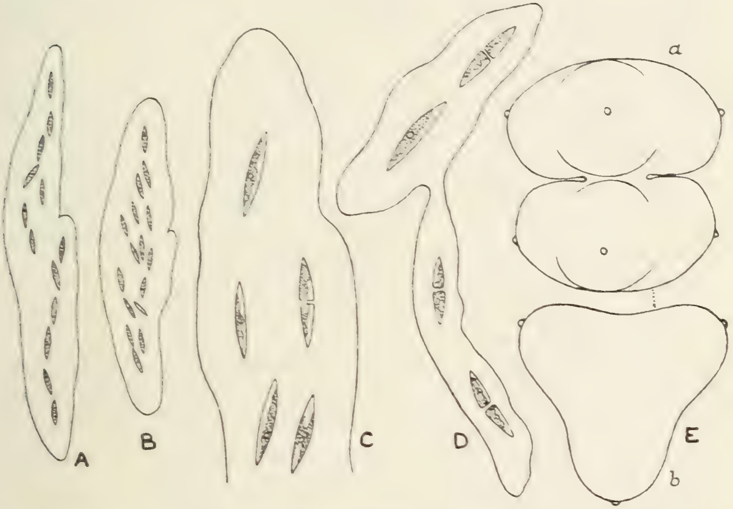


FIG. 6. A.–D., *Elakatothrix gelatinosa* Wille from the plankton of Wastwater. A. and B., Colonies, × 200; C., portion of colony, × 500; D., very small colony, × 500. E., *Staurastrum brevispinum* Bréb. forma *major* from the plankton of Brothers' Water, × 500.

19. ELAKATOTHRIX GELATINOSA Wille in 'Biol. Centralbl.', XVIII., 1898.

This interesting Alga has only previously been observed in the lakes of Norway. It is not uncommon in the plankton of Wastwater, more especially in August, September, and October, but the British specimens do not exactly agree with those described from Norway. The cells are slightly narrower, and their disposition within the enveloping mucus is often somewhat irregular, although their long axes are arranged more or less lengthwise in the colony. The exterior of the mucous investment is very firm and tough, and the colonies have the general form of a somewhat irregular spindle. Long.

cell. 16–25 μ; lat. cell. 3–4 μ; long. colon. 130–340 μ; lat. colon. 13–48 μ. (Fig. 6 A–D.)

Wille has also described an American species—*Elakatothrix americana*—with shorter and broader cells (*vide* 'Wille in Rhodora,' Aug. 1899, p. 150).

BACILLARIEÆ.

20. RHIZOSOLENIA MORSA W. & G. S. West in 'Trans. Roy. Irish Acad.', XXXIII., sect. B., part II., 1906, p. 109, t. 11, f. 5—7. *R. eriensis* H. L. Smith var *morsa* W. & G. S. West in 'Trans. Roy. Soc. Edin.', XLI., part III., 1905, p. 509, t. 6, f. 23.

This Diatom occurred in abundance in Thirlmere and Windermere. It is now known to occur in all the British lake-areas, and also in the Australian plankton. In the June plankton of Thirlmere resting-spores were noticed. These were relatively small, and were formed towards the middle of the cell. They were broader than long, and furnished with strong walls. Long. spor. 9 μ; lat. 12 μ. (Fig. 2).

21. TABELLARIA FENESTRATA (Lyngb.) Kütz. var. ASTERIONELLOIDES Grun.

This plankton-variety is fairly general in the English lakes and the elongated form of the frustules is maintained much more constantly than in the Scottish lakes. In the plankton of Grasmere colonies with very long frustules were plentiful. Long. frust. 86 μ; diam. colon. 170 μ.

The first British record of this variety was in 1902, when we recorded it from Lough Neagh and Lough Beg, but since then it has been found abundantly in all the lake-areas.

MYXOPHYCEÆ.

22. LYNGBYA BIPUNCTATA Lemm. in 'Forschungsb. Biol. Stat. Plön.', VI., 1900, p. 138, t. 2, f. 48; *ibid.* X., 1903, p. 152.

This species was frequent in both Codale and Easedale Tarns. Diam. trich. 1.4 μ; long. cell, 4-5.5 μ. Close to each end of every cell is a strongly refractive granule, the rest of the cell-contents being homogeneous, and of a pale blue-green colour. The filaments were flexuose, but not twisted into any regular spirals, as is sometimes the case. It appears to be very closely allied if not identical with *L. Lagerheimii* (Möb.) Gomont. The narrow plankton-species of *Lyngbya* require further investigation and considerable revision.

(*To be continued*).

SOME NEOLITHIC HAMMER-HEADS FROM E. YORKS.

T. SHEPPARD, F.G.S., F.S.A.Scot.

(PLATE XVI.)

THE archæological section of the Hull Museum has recently been enriched by a number of interesting objects. Amongst these are some hammer-heads of more than usual value, from the careful way in which they have been constructed, and also from the fact that they are of somewhat uncommon types. In each case the entire surface of the stone has been carefully worked, in order to give the shape to the implement, though in one instance, namely the Bempton specimen (fig. 2), it is quite possible that a well-rounded beach pebble may have been selected, the implement being shaped from it with less trouble than would have been the case from a rough piece of stone.

Perhaps the neatest weapon is that shown in fig. 3, which was found at Sproatley in Holderness. This is made from a highly crystalline fine-grained igneous rock, probably obtained from the local drift, and is very symmetrically shaped. In proportion to the weapon, the hole for the haft is large. It seems to be rather different in type from any figured by the late Sir John Evans in his 'Ancient Stone Implements of Great Britain.' The weapon is roughly egg-shaped, the sides and ends being convex, whilst the top and bottom are slightly concave. It is 3 inches in length, 2¾ inches in width, 1⅛ inch in thickness, and the hole is an inch in diameter at the outsides, being slightly less in the centre. It weighs 7½ ounces.

A somewhat similar type of weapon is that shown in fig. 4, though the top and bottom are convex, and the extremities are rather more pointed than in the Sproatley example. It was found in the Carrs at Burton Agnes in 1890 by a gamekeeper, and was presented to our collection by the Rev. C. V. Collier, F.S.A. The stone is of a hard quartzite or altered sandstone, such as occurs in the local drift, but the chief interest in the weapon is the fact that it is in an unfinished state. The sides have not been rounded off as in the Sproatley example, and although an attempt has been made to bore a hole for the shaft from each side, the work has not been completed, there being less than one-eighth of an inch still to cut through. It well illustrates the probable method of boring the hole, viz., by means of sand and a stick, the scratches round and round being distinctly visible. The length of the implement is

3½ inches; it is 2 inches wide, and 1⅜ inches deep. The hole for the handle is 1⅛ inch across on each side. It weighs 9 oz.

A hammer-head of somewhat unusual type is illustrated in fig. 2. This was recently found at Bempton, and the aperture for the haft is remarkably well drilled, being perfectly circular, and well polished inside. Its shape can best be ascertained from the photograph. The material is a very hard quartzite, probably a beach boulder. It is 2¼ inches long, 1¼ inch wide at the widest part, 1½ inch in thickness, the hole for the handle being 7/10ths of an inch across, slightly narrowing towards the centre. It weighs 7 oz.

Perhaps the most remarkable of the series, however, is the specimen shewn in fig. 1, which was found at Hotham. It is made of polished flint. The specimen is interesting, as it has not been perforated in the ordinary way by boring, the nature of the material of course making such a feat well-nigh impossible. What has happened is that the early hammer-maker has selected a large slab of flint, which has had a natural hole or flaw through it, and the hammer-head has been worked round the hole. It is 3 inches long, 2¼ inches wide, 2 inches deep, and weighs 9½ ounces. The only other perforated hammer of this material of which I have any knowledge is also an East Yorkshire specimen, in the collection of Mr. Thomas Boynton, F.S.A. It is not of Yorkshire flint, but is made from one of the tougher travelled flints such as occur in the glacial clay of East Yorkshire.

◆

Quick Nest-Building by Blackbirds.—In preparation for the camp of the East Lancashire Royal Engineers at Ben Rhydding, a quantity of timber (for fuel, etc.) was carted from the railway station on to the camp-field, on Thursday, May 27th. Short of two days later, on Saturday morning, May 29th, this pile contained a Blackbird's nest, with one egg in it. This pair of birds would probably have to build another hurried nest, as the wood was quickly put into use with the arrival of the regiment on the latter date.—H. B. Booth, Ben Rhydding.

As a supplement to Mr. Booth's note, I may mention the case of a Mistle Thrush, which came under my notice several years ago. A nest of this species was to be found regularly year after year in a forked branch of a certain tree. Visiting the tree one Sunday, there was not the slightest signs of a nest, On the following Saturday the usual place contained a nest and four eggs.—R. Fortune.

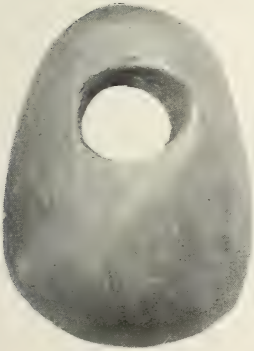


Fig. 1.

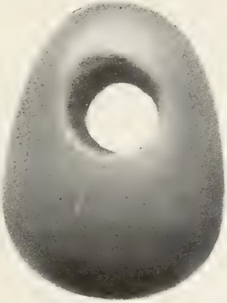


Fig. 2.

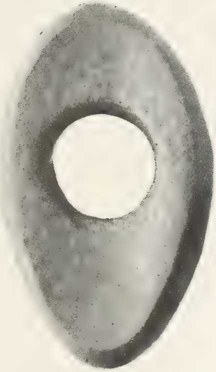


Fig. 3.

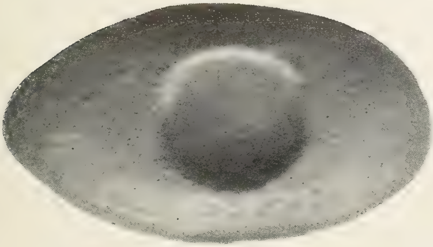


Fig. 4.

Stone Hammer-Heads found in East Yorkshire.

BRITISH MUSEUM
NATURAL HISTORY

CORNICULARIA KOCHII CAMB.—A SPIDER NEW TO GREAT BRITAIN.

WITH A KEY TO THE BRITISH CORNICULARIÆ.

WM. FALCONER,
Linthwaite, Huddersfield.

(PLATE XVII.).

IN a paper entitled 'On some Rare Arachnids obtained in 1908,' and issued in the 'Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne,' New Series, Vol. III., part 2, 1909, Dr. A. Randell Jackson describes and figures a new spider under the name of *Cornicularia valida,* founded on a solitary female, which he took from amongst fallen leaves under a thorn bush on the banks of the Dee, at Saltney Ferry in Cheshire. Through the kindness of its discoverer, I have been able to compare this female with others which lately came into my possession, and which were collected in April of the present year by Mr. T. Stainforth of the Hull Museum, on the North Lincolnshire coast, and sent to me for identification. Included also in the collection were a couple of males, which are undoubtedly of the same species. On examination, the latter were determined to be examples of the *C. kochii* Camb., described and figured in the 'Proceedings of the Zoological Society,' 1872. Mr. F. P. Smith, of London, was of the same opinion, and the Rev. O. Pickard-Cambridge, on a male being submitted to him, confirmed the identification, though he doubts its identity with the spiders so named both by Kulczynski in his 'Araneæ Hungariæ,' and by Simon in his 'Les Arachnides de France' and 'Histoire Naturelle de Araignées.' *C. valida* Jackson is therefore the hitherto unrecognised female of *C. kochii* Camb., (the name becomes a synonym), while the male of the latter is here for the first time recorded as an inhabitant of these islands.

The Corniculariæ are small spiders, ranging in size between two and three mm., usually with black bodies and reddish or yellowish legs, and may be met with amongst the moss, fallen leaves and herbage of woods and marshes. They are members of the group Erigoneæ, and belong to that section of it, which is characterised by an elongated oval cephalothorax, a sternum longer than wide; and in the female sex by a palpus which has the tibia much longer than the patella, and more or less enlarged from base to summit, and the tarsus strongly acuminate. From the other genera comprised in the same section, they may be thus distinguished. In *Wideria* Sim. the posterior row of eyes, instead of being straight or nearly so, is curved strongly backwards. In *Walckenaera* Bl. the front is wider and the eyes occupy only a portion and not the whole of its width. In *Prosopotheca* Sim. the posterior eyes are much larger and closer In *Tigellinus* Sim. the tarsi of the first pair of legs, instead of being about the same length as, are much shorter than, the metatarsi ; while the tibial spines are also longer and stouter.

Eight species of Corniculariæ have now been recognised in the British Isles. Two only of these, *C. cuspidata* Bl. and *C. unicornis* Camb., can be considered at all common ; the rest are amongst our rarest spiders. Of *C. pavitans* and *C. pudens* Camb., the solitary type females from the Cheviots, 1871, and of *C. lucida* Camb., two males from Dorset, 1870 and 1900, alone exist, while *C. karpinskii* Camb. has been taken twice—in Lanarkshire and Cumberland, 1900. The males of four species—*C. cuspidata* Bl., *C. unicornis*, *C. karpinskii* and *C. kochii* Camb., are provided with a very distinct tubercle springing from the centre of the ocular area. In two species, *C. vigilax* Bl. and *C. lucida* Camb., there is no such process.

Apart from minor differences, the presence or absence and the form and size of this tubercle, will, therefore, together with the structure of the palpus, especially of the tibial joint and of the palpal organs, most readily distinguish the males of the genus from each other ; while the formation of the vulva, and the position and size of the eyes will render the same service in the case of the females.

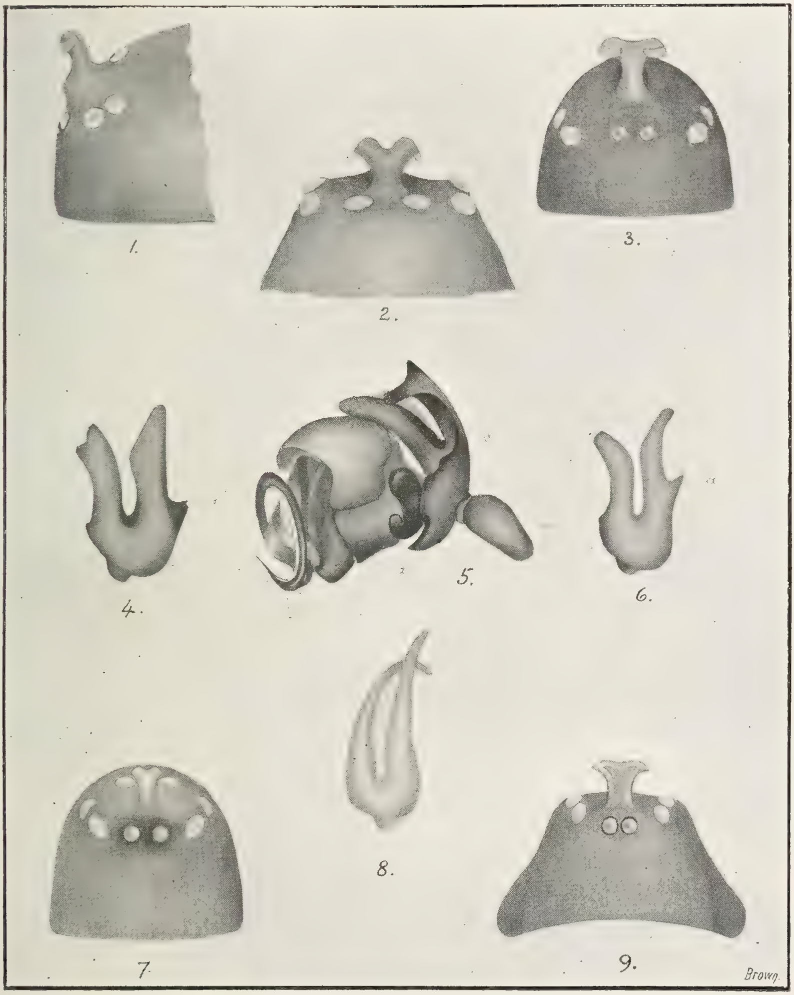
Fam.—ARGIOPIDÆ.
Sub-fam.—LINYPHIINÆ.
Group—ERIGONEÆ.
Section—WALCKENAERINI.

CORNICULARIA KOCHII Camb.

Length of male, 2·6 mm.

The cephalothorax of this spider is a very dark brown, devoid of punctate impressions, but somewhat rugulose behind at the sides and back. The abdomen is black and clothed with short hairs. The falces and mouth parts are a lighter dark brown, and the joints of the palpus, except the digital joint, which is a little darkened, are pale yellow. None of the above parts present any exceptional feature.

OCULAR TUBERCLE. This process (figs. 1, 2 and 3) in this



Cornicularia kochii, Camb.

BRITISH MUSEUM NATURAL HISTORY

spider is most characteristic. It is not only of a different shape and much larger and stronger than in the other species, being quite discernible in spirit with the unaided sight, but is also deeply divided at its extremity into two distinct, divergent lobes, which are convex above, concave beneath, and curved slightly downwards, with their edges ciliate with short, stiff, straight, equal, pale-coloured hairs. The under surface of the column is furnished towards the base with a number of longish, stiff, irregular, spreading hairs.

In *C. cuspida* Bl., the tubercle is simple and obtuse ; in *C. unicornis* (fig. 7) and *C. karpinskii* Camb. (fig. 9), besides being much smaller, it is only indistinctly bilobed at the apex.

PALPUS. THE TIBIAL JOINT is prolonged above in a very large, long, irregular, curved apophysis, which is divided almost to the base into two narrowly separated (latterly a little divergent) portions, slightly unequal in length and directed forward. The inner and longer limb, somewhat bent in the terminal part, lies close to the digital joint, and is narrowed and slightly sinuous towards the apex. Near the base on its outer margin, it bears a strong tooth. The outer limb is further removed from the digital joint, is abruptly acuminate at the apex, and supplied a little below that point with a stout, obtuse, oblong branch directed downwards and outwards. The other males do not possess the last-named process.

In *C. unicornis* Camb. (fig. 6) and *C. karpinskii* Camb. (fig. 8) the tibial apophysis is likewise divided almost to the base. In the former, however, the limbs diverge, and the inner one bears a tooth ; in the latter, the limbs converge, and the inner one is without a tooth. In *C. cuspidata* Bl. the apophysis is undivided.

THE PALPAL ORGANS are bulky, complex, and prominent, the most noticeable features being (1) on the outer side at the base, a stout dark brown C-curved process (fig. 5a) ; (2) at the extremity, obliquely inclined outwards, a long, black, circular, spine (fig. 5b) ; (3) on the inner side, springing directly from beneath the apical spine, a long, strong, curved, red-brown tooth directed backwards towards the base of the palpal organs.

EYES. Eight in number, rather small, the fore centrals being decidedly the smallest ; arranged in two rows, which are curved away from each other, enclosing an oval space. The curve of the posterior row is very slight, that of the anterior row is stronger. Both the hind and fore centrals are much closer to each other than to the laterals of the same row. The latter pair are almost contiguous, being less than half their diameter apart. The former are more separated, being fully a diameter apart. The quadrilateral which they form is much longer than wide, and narrower in front than behind.

The male from which the above description and the drawings were taken, together with most of the females, is now in the Hull Museum, and may be seen there by anyone interested in the matter.

C. kochii Camb. has now occurred in close proximity to the sea in three English counties :—in Cheshire, one female, 1908 (Dr. Jackson) ; in Yorkshire, at Saltend Common, near Hull, where other very rare and unexpected spiders have occurred, one female, May 1909 (T. Stainforth) ; and in Lincolnshire, first on the occasion of the Hull Scientific and Field Naturalists' Club Excursion, 17th April, 1909, two males, four females on the coast between South Ferriby and Barton-upon-Humber (T. Stainforth) ; later, in May, two females (T. Stainforth), and three females (E. A. Parsons) in the same place, one female between Barrow Haven and Barton Haven (T. Stainforth), and one female between Barrow Haven and New Holland (T. Stainforth).

I am informed by Mr. Stainforth that the localities on both sides of the Humber are similar in character—the flat portion of land covered with the usual estuarine plants (sea aster, sea pink, maritime plantain, etc.), which lies between the barren mud flats of the river and the clay embankments, and is submerged only at the highest tides. The specimens were found on the dried mud beneath or amongst the coarse matted grasses and the estuarine plants.

TABLE OF THE BRITISH CORNICULARIÆ.

MALES.

A.—Ocular area with a vertical tubercle.
I. Tubercle obtuse and simple. Tibial apophysis undivided .. .. Cuspidata Bl.
II. Tubercle bilobed at apex. Tibial apophysis divided almost to base.
1. Tubercle very large, deeply divided at apex into two distinct divergent lobes. Outer limb of tibial apophysis with an oblong branch near its extremity Kochii Camb.
2. Tubercle small, indistinctly bilobed at apex. Outer limb of tibial apophysis without a branch.
(*a*) Limbs of apophysis diverge. Inner limb with a tooth near its base. .. .. .. Unicornis Camb.

(*To be continued*).

YORKSHIRE NATURALISTS AT BOWLAND.

In their peregrinations the members of the Yorkshire Naturalists' Union during the past half-century have visited many parts of the county, but rarely have they got so far from the madding crowd as during Whit week-end, when the district around Bowland, or Bolland, was investigated. Newton-in-Bowland was decided upon as the headquarters, and its great distance from the railway, whilst adding a charm to the outing from a naturalist's point of view, had its disadvantage as regards comfort and approach.

Newton, a compact old-world village, with substantially built farmhouses, mostly erected in the latter part of the seventeenth century, is most pleasantly situated. In the heart of the village is a small quarry, which delighted the geologists by the great number of well-preserved Carboniferous Limestone fossils that it contained, notably a large quantity of crinoid 'heads'—specimens not usually obtainable. Under the guidance of the President of the section, Dr. Dwerryhouse, this party had a profitable time, and on the side of one of the numerous streams were successful in finding several characteristic zonal fossils.

The geologists were on classic ground. In Knoll Park are enormous rounded hills resembling huge pre-historic tumuli in being so symmetrical. Instead, however, of their containing the remains of British chiefs, they are entirely composed of the dead shells of various molluscs, and in amongst them are corals, zoophytes and trilobites. In fact, the hills are to all intents and purposes, reefs formed in a Carboniferous sea, the great mounds being formed by the accumulation of the shells, etc., of the one-time inhabitants of the water. These reefs were eventually solidified, surrounded by shales containing a different fauna, and the whole buried by thousands upon thousands of feet of strata. The geological history of the district from then to the present time is an exceedingly interesting one, but we can only briefly refer to the last chapter. In comparatively recent times the whole of the superincumbent strata have been denuded—even the shales surrounding the knolls have been largely swept away. But the result is wonderful. There, in the valley, are the heaps of shell remains—now high and dry ; otherwise but little changed from that long distant time when they were formed on the ocean floor.

It is true that geologists have different ideas as to the way these hills were formed, but Mr. R. H. Tiddleman was the first to suggest their origin in the way already described, and certainly the very critical examination, made on this occasion, resulted strongly in favour of Mr. Tiddleman's theory—at any rate so far as these particular hills are concerned.

One hill especially, which fortunately had many sections, was examined yard by yard, from base to summit, the investigation extending until a very late hour. From this it was clear that the beds on the top were practically level, whilst the strata dipped outward at a high angle all round, after the manner of a colliery waste-heap. From the various exposures in the district—both in the limestone and in the shale, which in a few places had survived the sub-aerial and glacial erosion—several very fine and rare specimens were secured.

The party included a few antiquaries, who were successful in securing an interesting, if gruesome, relic of the 'good old days.' This consisted of a set of gallows irons, which were doing duty for a very modern purpose on a farm.

The botanists, ornithologists, and, in fact, all the sections found the district a veritable paradise, the appearance of the countryside being much improved by the recent rains.

The botanists were favoured with the leadership of the Rev. W. Crombie and Miss Peel, and were successful in finding the places where quite large series of interesting plants were growing. It rarely happens that there is such a variety of unusual forms as were seen by the botanists on this excursion.

Mr. J. Turner writes :—'Probably the most characteristic plants of the hedgerows were the primrose and the water avens. The common meadow-rue was also noted. A very striking feature of Dunnow Wood was the broad-leaved garlic, which appeared to be exterminating the wild hyacinth. The rock-rose was growing in profusion on the top of the scar, where also the hairy violet was found, and orpine or live-long was growing on the face of the rock.

The Old Hodder is a veritable botanical paradise, and here the marsh cinque-foil was recorded, though not in flower. Indeed, the season was rather backward, and consequently some plants that were diligently sought were not found. This was the case with the Alpine cinque-foil and Solomon's Seal.

The whole district is exceedingly rich in the variety of its plant forms, and might, with advantage, be visited at the end of July, when the later species will be making their appearance.'

A complete list of the plants noted on this excursion was prepared, and has been forwarded to the Secretaries of the Botanical Section for preservation.

Mr. H. B. Booth, who had charge of the Vertebrate Section, writes :—' A total of seventy-two species was noted, viz., twelve mammals, fifty-six birds, one reptile, one amphibian and two fishes. The district was chiefly interesting on account of the variable distribution of the ordinary common species, some being abundant, others comparatively scarce, and other species which might have been expected, could not be detected. For instance, it seemed hardly like being in Yorkshire, to be where the Rook, Jackdaw, Hedge-Sparrow, Yellow-Hammer, etc., were rarities, or almost unknown.

The following mammals were noted :—Mole, Common Shrew Stoat, Fox, Rabbit (abundant), Hare, Water-Vole, Field Vole (common*), Long-tailed Field Mouse, Common Rat, Squirrel and Hedgehog—the last two apparently being uncommon.

A feature of the district was the abundance of the common rat far away from human habitations and out-buildings. We found them almost everywhere—along the riverside, the mountain-side (Whitendale), and in the keepers' traps in the woods and fields.

Miss M. N. Peel had given a very good forecast of the avi-fauna of the district in the programme for the excursion. No great rarity was noted. As so little has been previously reported from this district, and as the chief interest lies in the somewhat unusual distribution, the species in the following list are given in their *comparative* abundance or scarcity.†

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* The rejected ' pellets ' of owls were numerous in the woods. All those examined contained the bones and fur of small mammals, and apparently of the same species—one ' pellet ' also containing the elytra of a Dor Beetle. All the nine skulls that I took home for examination were those of the Common Field Vole (*Microtus agrestis*). This destructive little animal must be very numerous in the district—we noticed its runs in several places. It is well that owls are protected, as I do not know any place in the West Riding where a plague of Voles would be more likely to occur.—H.B.B.

† It will be understood that the quantative terms applied to the different species do not imply that they were present in equal numbers. For instance the Lapwing and Grey Wagtail both come under the term ' Common.' That is as we should consider each of them ' common ' in the West Riding.

The following were abundant :—Song Thrush, Blackbird, Starling, House Martin and Willow Warbler ; comparatively common—Robin, Dipper, Blue Tit, Grey and Yellow Wagtails, Meadow Pipit, Spotted Flycatcher, Swallow, House-Sparrow, Chaffinch, Swift, Cuckoo, Red Grouse, Pheasant, Lapwing, Snipe, Common Sandpiper and Curlew ; fairly common — Mistle-Thrush, Ring-Ouzel, Whitethroat, Great Tit, Wren, Goldcrest, Garden Warbler, Wood Warbler (rather local), Pied Wagtail, Sand Martin, Lesser Redpoll, Skylark, Kingfisher, Sparrow-Hawk, Heron, Ring-Dove, Partridge, Water-Hen, Golden Plover, Redshank, and Lesser Black-backed Gull (seen on several occasions). The Greenfinch and Tree-Pipit were not so common as might have been expected ; and the following species were only seen or heard on one occasion—Redstart, Hedge-Sparrow, Blackcap, Lesser Whitethroat (in Knowlmere Park), Twite (on Newton Fell), Rook,* Carrion Crow, Nightjar (in Whitendale), Woodcock and Corncrake.

It was rather a surprise that the following species were not met with at all, as the district appeared to be very suitable for them—Wheatear, Whinchat, Jackdaw, Magpie, Yellow-hammer, not any of the Buntings, nor any species of duck. No Owls were seen nor heard, but there was ample proof of the presence of the Tawny and Long-eared Owls by their numerous rejected pellets. The Slow-worm (on top of crag, Dunnow Wood), was the only reptile ; and the Frog the only amphibian noted. Trout were plentiful in the Hodder, and we saw a large Salmon, quite thirty-six inches long. It was very sluggish, and only moved slowly away when touched.'

Dr. Dwerryhouse presided at the general meeting at which the reports of the various sections were presented.

T. S.

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Mr. W. Eagle Clarke writes on the 'Chicks of the Sanderling,' and Mr. A. D. Sapsworth on the 'Peregrine Falcon on the Yorkshire Cliffs,' in the July *British Birds*.

In the *Mineralogical Magazine* for July is a paper 'On a New Method of Studying the Optical Properties of Crystals,' by the late Dr. H. Clifton Sorby.

In the July *Bradford Scientific Journal* are the following papers :—'Local Dart or Hover Flies,' by J. H. Ashworth ; 'Fertilisation of the Sweet Pea,' by P. Clapham ; 'Where the Honey comes from,' by 'Etain' ; 'Living Things and Things Inanimate,' by J. H. Rowe ; and 'Annelid Hunting Around Bradford,' by Rev. H. Friend.

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* The nearest rookeries appear to be at Dale Head (about 5½ miles), Bromley Wood, (Clitheroe), and Chatburn. We were informed that formerly there was a rookery at Newton.

FIELD NOTES.

MOLLUSCA.

***Arion ater* L. as a Wart Curer.**—I have just heard for the second time from the same man how he was cured of a large wart by the application of a black slug. In 1852 or thereabouts he had a very bad wart on the back of his hand. An old woman suggested to his mother that he should see a local tinsmith [Richardson, of Queen Street] about it. He was taken, and the tinsmith rubbed the hand gently, and told him to get up early next—or some other—morning before the sunrise, and look for a black slug. The wart had to be rubbed by the slug, and then the slug had to be impaled on a hawthorn spine, and as the slug melted away, so would the wart. 'So it was,' he declared to me, though he could not say how long it took to disappear. In Rhys' 'Celtic Folklore,' in the first volume, this treatment is mentioned, but the doctor's informant forgot what became of the slug. The whitethorn here has no magic significance, I think. The rest is, of course, sympathy.—S. L. PETTY, Ulverston.

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COLEOPTERA.

***Gracilia minuta* F. at Selby.**—I beg to record the occurrence of this interesting little longicorn here as an importation, a local fruiterer calling my attention to hundreds which were in a hamper conveying French-grown carrots. I submitted specimens to the Rev. A. Thornley, who, quoting 'Fowler,' writes—'In dead twigs in hedges, etc., and often in old hampers etc., local, common, having been recorded for London district, Devon, Hastings, Bristol, Cambridge, Burton-on-Trent, Sunderland (two specimens) perhaps imported. (Not recorded from Scotland).' Mr .Thornley has recorded it himself from Notts. and Lincoln. Has it been recorded from Yorks. 'imports' or otherwise ? *—JOHN F. MUSHAM, F.E.S., Selby.

—: o :—

BIRDS.

Brown Rook in N. Lincs.—A brown, almost chocolate-coloured rook has recently been observed at the rookery near Baysgarth Park. Mr. A. B. Hall informs me he has seen it several times, and that Mr. Frank Bygott, who resides near the rookery, has a similarly coloured bird, stuffed, which he shot many years ago.—G. W. MASON, Barton-on-Humber.

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* The species is recorded for Hull by Mr. T. Stainforth in 'Trans. Hull Field Nat. Club,' Vol. 3, pt. 1, 1903, p. 109; and has been taken at Clapham and Thackley by Mr. F. Booth ; recorded in the Y.N.U. Annual Report, 1908, p. 21.—EDS.

REVIEWS AND BOOK NOTICES.

A Guide to the Whales, Porpoises and Dolphins in the British Museum (Natural History), has recently been issued at 4d. It can be looked upon not only as a reliable guide to the fine series of aquatic mammals in the National Collection, but as a general introduction to this fascinating branch of natural history. That it has been written by Mr. R. Lydekker is sufficient guarantee as to its reliability. There are thirty-three illustrations.

The Bradford Public Libraries' Committee has issued a **Catalogue of the Lees Botanical Collection** in the Reference Library. 36 pp., price 3d. This contains a list of the botanical books and pamphlets purchased from Dr. Arnold Lees, as well as of a few geological items. To facilitate reference there is an Index of Subjects, and an Index of Authors. These special catalogues are useful, and this appears to have been carefully compiled.

Birds and their Nests and Eggs by **G. H. Vos.** London : George Routledge, 148+223+240 pp. 3/6.
This volume contains, in one cover, the three series, under the same title, which had been previously issued at 1/- each, already noted in these columns. The original pagination, titles, etc., are, however, maintained, giving the volume a patchy appearance. Naturally, the remarks already made in reference to the matter and illustrations also apply to this book. It has the advantage, however, of a brief index, and the volume will make a cheap and acceptable gift to a schoolboy.

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NORTHERN NEWS.

The following observation from a recent issue of a 'natural history' journal shews with what ability a properly-trained naturalist can explain anything :—'The reason for the rarity of snakes [in Ireland] is possibly the abundance of pigs, which are great devourers of snakes.'

Mr. L. Glauert, F.G.S., has recently contributed a paper on 'A New Species of *Sthenurus*' to the Geological Society of London. This species of Kangaroo had been recognised amongst bones found in the Mammoth Cave, Margaret River, Western Australia.

The mantle of Gilbert White has evidently fallen upon the Vicar of Pontfaen, near Fishguard, who writes that 'House-martins who [sic] have built nests under the eaves of his house, have been regularly fed by hedge sparrows, which took rice from chickens, and carried it to the nests.'

Mr. C. Waterfall has been lecturing before the Hull Junior Naturalists' Society on 'The Causes contributing to the Rarity of Plants.'

'Butterflies Chasing Children at Selby' is the title of a note in 'Wild Nature Week by Week,' *specially contributed* to the 'Yorkshire Evening Post.' We hear that the children have passed a good night at the hospital, but are still suffering from shock.

We regret to learn that Scotter Common, Lincolnshire, has been fired, probably through carelessness, and that about 200 acres of this fine common have been cleared of vegetation, and considerable damage has been done to game, etc.

From Mr. T. Petch, B.Sc., the Government Mycologist in Ceylon, we have received a number of reprints, the most interesting of which deals with 'The Phalloideæ of Ceylon.' Judging from the many excellent plates, these curious fungi are provided with veils. The compositor has evidently not grasped the fact that the specimens belong to the vegetable kingdom, which perhaps accounts for the unfortunate misprint 'Nat. sire' on the plates.

4 AUG. 1909

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A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

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THE MUSEUM, HULL;
AND
T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
J. GILBERT BAKER, F.R.S. F.L.S.,
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T. H. NELSON, M.B.O.U.,
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JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.
RILEY FORTUNE, F.Z.S.

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NOTES AND COMMENTS.

CHARLES DARWIN AS GEOLOGIST.

Under the above title the Cambridge University Press has published the Rede Lecture, delivered by Sir Archibald Geikie, at the recent Darwin Centenary Celebrations at Cambridge.* We can cordially recommend this little volume to our readers. In it Sir Archibald points out that hitherto sufficient importance does not appear to have been attached to Darwin's geological work. It was the science of geology that first commanded Darwin's attention, and doubtless its study had much to do with the line of research he followed, with such brilliant results. Sir Archibald, in his familiar masterly manner, deals with Darwin's geological work; his South American, etc., researches whilst on the 'Beagle'; his brilliant discoveries with regard to coral islands; his work on the formation of soils, etc.

A USEFUL HAMMER.

As illustrating the fact that Darwin was a true field geologist and always provided with a hammer, the story is told that whilst some officers were surveying in the island of San Pedro, a fox (*Canis fulvipes*), a new species, was sitting on the rocks. He was so intensely absorbed in watching the work of the officers that Darwin was able, by quietly walking up behind, to knock him on the head with his geological hammer. 'This fox, more curious or more scientific, but less wise than the generality of his brethren,' is now in the Natural History Museum, South Kensington.

INTERESTING FIND AT HUDDERSFIELD.

Forty years ago a description of a fossil cone from the Coal Measures was given by Carruthers, and he named it *Volkmannia binneyana*—now known as *Colamostachys binneyana*. Although many specimens are known, in not a single instance has the cone been found in connection with vegetative organs of any kind. In the July '*New Phytologist*' Mr. H. Hamshaw Thomas describes and figures a specimen shewing the cone with four whorls of Calamite leaves attached at the base. From the size, shape, and arrangement of these, it may be concluded that they are of the type known as *Colamocladus* (=*Asterophyllites*) *grandis* Sternb, and thus an important advance has been made in this particular branch of palæobotany. The specimen upon which Mr. Thomas's notes are based was found in a calcareous nodule from the Halifax Hard Bed of the Lower Coal Measures of Huddersfield.

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A NATIONAL FOLK-LORE MUSEUM.

Mr. Henry Balfour's Presidential Address to the Museums' Association, delivered at Maidstone on July 13th, is printed in the 'Museums' Journal' for July. In this Mr. Balfour, whose excellent work at the Pitt Rivers Museum in Oxford is well known, advocates the formation of a National Folk Lore Museum. He points out that in the Guildhall Museum, London; the Museum of the Society of Antiquaries in Edinburgh, and in some other museums, more or less definite attention is paid to obsolete and even obsolescent industries, customs and appliances in the British Isles. The British Museum, however, is everything except British as far as ethnology is concerned. There is reticence in dealing with our own nation which is specially noteworthy in view of the name which is applied to this great institution. We trust that something tangible may be the result of Mr. Balfour's appeal

◆◆

My Life Among the Wild Birds in Spain, by **Willoughby Verner.** Bale, Sons & Danielsson. 468 pp., 21/- net.

This book contains a chatty record of the *crême de la crême* of bird-nesting. Colonel Verner, as his writings elsewhere have shown, has been unusually fortunate in his frequent visits to Spain, and with pluck and perseverance, has visited and photographed the nesting sites of a whole host of *rara aves*; he has certainly been in an ornithologist's paradise. He has the further ability of recording his reminiscences in a pleasant style, and with the aid of pencil and camera has produced a volume the only drawback to which we can find is that it is perhaps a little expensive for the ordinary lover of birds. In reading the narrative, it is pleasant to find that the Colonel is by no means a nest-robber, and he is exceedingly bitter in his remarks against those systematic collectors of eggs who, largely for pecuniary gain, bring disrepute to the genuine ornithologist. Amongst the illustrations are scores that will appeal to the British naturalist, those of the Great Bustard, Booted Eagle, Black Kite, Red Kite, Goshawk and Crane being unusually good. The photographs of eggs and nests that are reproduced include several that most English collectors will hardly ever hope to see in nature. There are many interesting experiences related in this volume, which we should like to relate, did space permit; but we must refer our readers to the book itself. There is one, however, which we must mention. A nest of a Bonelli's Eagle, after a heavy climb, was found to contain but one egg. It was taken, and a tame goose's egg was substituted. Soon after, a naturalist, 'who never collected eggs, but only photographed them,' came to this identical old-world place, in search of 'copy.' Some little time after, Col. Verner received an issue of 'Country Life,' containing a most graphic account of the identical nest, and with the apparent purpose of 'for all time recording his ignorance of Eagles and their eggs, the unfortunate writer went into the most minute details as to how the egg he had so gallantly obtained was "white and somewhat pointed at both ends," in fact, an unmistakable tame goose's egg.' As a contrast, Col. Verner gives a photograph of the egg that was in the nest before the goose's egg was substituted. So that even in the wilds of Spain, miles away from 'anywhere,' one should really see the bird lay the egg before being certain it is genuine! In Yorkshire this same trick has been served on more than one occasion, and in all probability at the present time coloured pigeon, etc., eggs are reposing in collectors' cabinets with altogether different labels on them.

OYSTERCATCHER NESTING AT SPURN.

OXLEY GRABHAM, M.A., M.B.O.U.

EVERY member of the Yorkshire Wild Birds' Protection Committee, and all those who are interested in our county's birds, will be pleased to hear that the Oystercatcher nested at Spurn this season, after an interval of twenty years. Mr. Digby Legard and I received a telegram from Robinson, our watcher, saying that he had at last, after much trouble, found the nest of the Oystercatcher, so we immediately set off for Spurn, and on the morning of June 21st, were fortunate enough to get two or three successful photographs. We were very anxious not to frighten the bird, so we did not keep her off her eggs for long, but she was by no means wild, and was soon back on her nest after the camera was rigged up.

Photo by] **Nest and Eggs of the Oystercatcher.** [*Oxley Grabham.*

The nest was on the Humber side, and, as can be seen from the photograph, was a mere scratching in the sand and shingle, partially surrounded by dead sea weed, which had drifted up on the shore. I was in great hopes that the eggs would hatch out safely, and Robinson kept me periodically informed that the hen bird was sitting all right. He could see her a long way off with his glass without going anywhere near the nest, but

I am very sorry to say that although all went well until July 11th, on which date the bird was still comfortably sitting, on July 15th, when Robinson went down, the eggs had been washed away. There had been a tremendous storm of wind and rain, and the water had come some six yards or so beyond the nest. This is a most unfortunate occurrence, and although the birds were about, Robinson could not see that they had any intention of nesting again when he last wrote to me on August 1st ; but we may hope now that they have started nesting once more in the district, that they will do so next year.

Photo by **Oyster Catcher on Nest.** [*Oxley Grabham*

Robinson states in his letter that there were more young Terns on the wing in the middle of July than he had ever seen before.

NEWS FROM THE MAGAZINES.

n *The Entomologist* for May, Mr. Claude Morley writes that two new species described in his 'British Ichneumons' turn out to be from New Zealand, and are not British.

A list of the 'Land and Freshwater Mollusca in the Scarborough District' is contributed to the July *Journal of Conchology* by Mr. J. A. Hargreaves.

British Birds for August contains a 'Photographic Supplement,' in which is reproduced a series of photographs taken by Miss E. L. Turner, showing the extraordinary behaviour of a Water Rail.

Homalium brevicolle Thoms., a new British beetle, is described in the May *Entomologists' Monthly Magazine.* The specimen was captured in carrion at Great Salkeld.

In the July *Irish Naturalist* Mr. R. F. Scharff figures and describes a speckled otter, trapped in Lough Sheelin. The only other record of a speckled otter the author has noticed is of one supposed to be in the Hancock Museum, Newcastle. As that specimen seems to have disappeared, the Irish example is unique.

NATURAL HISTORY OF RUNSWICK.

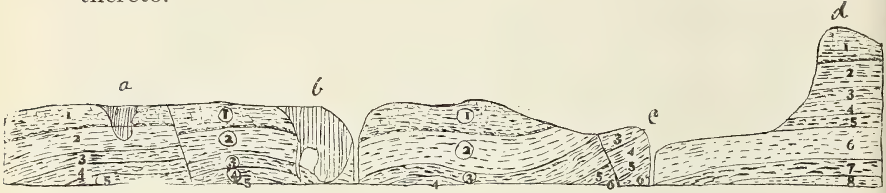
The two hundred and seventeenth meeting of the Yorkshire Naturalists' Union was held at Runswick, on Saturday, July 10th, and was well attended. The geologists, with Mr. J. J. Burton, F.G.S., as their guide, had a profitable day on the Liassic shale between Runswick and Kettleness. The botanists had the advantage of the leadership of Dr. W. G. Smith (Edinburgh), Dr. T. W. Woodhead, Mr. P. Fox Lee, and Mr. C. A. Cheetham, and in addition to mapping the vegetation features of the area, were successful in securing some interesting plants.

The general meeting was held under the chairmanship of Mr. J. J. Burton, at which the reports of the sectional officers were presented. Three new members were elected. The members passed a vote of sympathy with the relatives of the late Lord Ripon. His lordship had been a member of the Union since its formation, and always took a keen interest in its work.

The following reports have since been received :—

Mr. J. J. Burton, F.G.S., writes :—'The geologists had a good field day in a portion of the coast, which gives favourable opportunities for close inspection of the sections of Lias shewn in the cliffs between Runswick Bay and Kettleness point. The bay at Runswick is the mouth of an ancient pre-glacial valley through which a stream of considerable importance must have found its way to the sea. It is now completely blocked with boulder clay, and only a few streams of minor importance have cut into it. Boring operations in the immediate neighbourhood have shewn that this boulder clay deposit extends inland so as to connect up this choked valley with the drainage system of the large stream which has cut its way through the rocks, and formed the ravine at Staithes, where it enters the sea. It is one of the numerous cases in Cleveland where the blocking up of the old river valleys by ice has permanently changed the course of the rivers which once ran through them. The beds of some of the streams flowing through the boulder clay in the bay were examined, and shewed a surprising number of erratics. Many of these were from the Cheviots. Teesdale whinstone and large blocks of limestone were very numerous ; so also were Shap Fell granites. One of the latter blocks measured roughly 4 feet by 3 feet by 2 feet 9 inches. Many other far-travelled boulders were noticed, but the identity of some was not clearly established.

Travelling along the beach towards Kettleness, the succession of strata shewn on the sketch section was passed over, and was, in most cases, easily identified by the discovery of the fossils characteristic of the zone, although the difference in ornamentation and structure of some of the species is so slight, that it may be accidental in development, and not permanent in character, and therefore of doubtful value in assigning variety thereto.



1.—Lower Oolite.
2.—*A. communis.*
3.—*A. serpentinus.* } Upper Lias.
4.—*A. annulatus.*
5.—*A. spinatus.* } Middle Lias.
6.—*A. margaritatus.*
7.—*A. capricornus.* } Lower Lias.
8.—*A. jamesoni.*

a. Kettleness.
b. Runswick Bay.
c. Staithes.
d. Boulby=Rockliffe.

Two faults were located by the evident change in the strata, both having a downthrow to the west. Two physical features of interest to those who have given attention to coast erosion were also noted, and were very striking. First the loosening effect on the cliffs of even very small trickling streams of water, and secondly the undercutting of the hard rocks by the wasting away of the underlying soft shales. The result was shewn in the accumulated debris at the foot of the cliffs, where big blocks of sandstone, deprived of their support, had tumbled down, and lay in picturesque confusion.

Ascending the cliffs at Kettleness the Old Alum Works were visited, and some idea was formed of the extent of this extinct Cleveland industry by observing what an enormous quantity of shale had been quarried.

Returning to the beach, several caves were seen ; these might readily be attributed to wave action, but really are old jet workings.

A few cement doggers were observed just round Kettleness point, but these do not seem to be in evidence at all on the Runswick side. Some members staying over the week-end saw how these were carted up to the old cement works at East

Row, for manufacturing "Mulgrave Cement," and evidence of mining them was seen in the cliff in the top portion of the alum shale bed, which is the only place where these nodules appear to be found.'

COLEOPTERA.—Mr. M. L. Thompson reports that the following beetles were met with :—

Dromius linearis, Ol.
Tachyporus chrysomelinus, L.
Tachyporus hypnorum, T.
Cafius xantholoma, Grav.
Oxytelus rugosus, F.
Oxytelus tetracarinatus, Bl.
Anthobium torquatum, Marsh.
Coccinella 11-*punctata*, L.
Rhizobius litura, F.
Brachypterus pubescens, Er.
Brachypterus urticæ, F.
Meligethes æneus, F.
Meligethes picipes, Stm.
Enicmus minutus, L.
Atomaria fuscipes, Gyll.
Atomaria atricapilla, Steph.
Corymbites quercus, Gyll.
Helodes marginata, F.
Cyphon variabilis, Thunb.
Telephorus bicolor, F.
Telephorus flavilabris, Fall.
Rhagonycha limbata, Th.
Malthodes minimus, L.
Longitarsus suturellus, Duft.
Sphæroderma testacea, F.
Crepidodera transversa, Marsh.
Crepidodera rufipes, L.
Plectroscelis concinna, Marsh.
Anaspis maculata, Foure.
Apion radiolus Kirb.
Apion carduorum, Kirb.
Apion æthiops, Hbst.
Phyllobius pomonæ, Ol.
Phyllobius viridiæris, Laich.
Rhamphus flavicornis, Clair.
Grypidius equiseti, F.
Dorytomus pectoralis, Gyll.
Ceuthorhynchus erysimi, F.
Ceuthorhynchus contractus, Marsh.
Ceuthorhynchidius troglodytes, F.

The Rev. F. H. Woods writes that the conditions of tide and weather were not favourable for investigations of marine conchology. Nevertheless, the results were by no means without interest, and in most cases the specimens found were those of the living animals. In the roots of the larger seaweeds washed up were some good specimens of the so-called var. *lævis* of *Helcion pellucida*, which should rather be described as a state than a variety, the peculiar shape which the shell acquires being due to the hollow cavity which it makes for itself in feeding. The upper pools abounded in *Chiton cinereus*. One specimen of *Chiton ruber*, and one very large one of *Acmæa virginea* were found. At low tide there were a few specimens of *Acmæa testudinalis*, and great numbers of the tiny little bivalve *Turtonia minuta* among the roots of the smaller algæ, on which a quantity of the fry of *Lacuna pallidula* were feeding. But the most interesting shells were two specimens of what for the present I am disposed to regard as *Rissoa proxima*. The shell in question, which I have found occasionally at Scarborough and elsewhere, is like *Rissoa vitrea* in its cylindrical shape and deep sutures, but has the striæ of *R. striata*. It is possible that it may prove to be the var. *arctica* of the latter, between which and *R. proxima* there appears to be a good deal of confusion. Some specimens have finer and some coarser striæ, but otherwise they are similar. Jeffrey doubted whether *R. proxima* was a good species. The subject wants thorough investigation, and at present the specimens, even in some of the best collections, are not always satisfactory. Curiously enough the typical *Rissoa striata* was not found in Runswick Bay ; but it is almost certain that it occurs, as it abounds along the Yorkshire coast.

The following is a complete list of species found :–

Chiton cinereus.
Chiton ruber.
Anomia ephippium.
Mytilus edulis.
Turtonia minuta.
Lutraria elliptica.
Tapes pullastra (var. *perforans*).
Cardium edule.
Saxicava rugosa.
Zirphoea (*Pholas*) *crispata.*
Patella vulgata.
Helcion pellucida (with var. *lævis*).
Acmæa testudinalis.
Acmæa virginea.
Trochus cinerarius.
Lacuna divaricata.
Lacuna pallidula.
Littorina obtusata.
Littorina rudis.
Littorina littorea.
Rissoa parva.
Rissoa proxima.
Cypræa europæa.
Purpura lapillus.
Buccinum undatum.
Fusus antiquus.
Nassa incrassata.

Dr. W. G. Smith writes :—'The number of botanists present was not very large, but observations were extended over the week-end, and, although it is not possible in a short note to indicate the bearing of the observations on the history of the Cleveland vegetation, a considerable amount of work was accomplished. Special attention was paid to the woods of the coast region, including Mulgrave Woods and those in the steep, narrow valleys of Runswick Bay. One feature of interest is that Birch is not a conspicuous tree on the boulder clay, and in none of the woods was Birch so abundant as it is in the woods of the moorland edge ; the English Maple (*Acer campestre*) was noted as common in all the woods examined, and it must be regarded as typical of the Cleveland boulder clay. The scrub and grassy slopes of the boulder clay was also carefully examined for comparison with the soils over the natural rock. Amongst the typical clay plants, Fleabane, Wood Vetch, Hemp Agrimony, and the Large Horsetail were conspicuous, whereas these were absent over the drier soils over the Lias. The casuals of the unkempt gardens of Runswick also attracted much attention. The most noteworthy record from the floristic side was *Vicia bithynica* found by one of the members of the camping party who devoted their energies mainly to mosses.'

Mr. P. Fox Lee adds that the following plants were observed by Mr. Elgee, of Middlesbrough, and himself. In the upper part of Hob Holes, a fine wooded gorge opening to the coast at Runswick, is a flat expanse of marshy ground covered with a vigorous growth of *Carex acutiformis* Ehrh. Here and in other parts of the Hob Holes were *Valeriana dioica* L., *Veronica officinalis* L., *Pedicularis sylvatica* L., and *Ranunculus hederaceus* L., besides an abundance of *Equisetum maximum* Lam. There were also mushrooms, puff-balls and fairy rings of other fungi in the adjacent grass lands.

T. S.

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The Report and Proceedings of the **Manchester Field Naturalists' and Archæologists' Society** for 1908 has just been received. It contains details of the various excursions of the Society, from January 11th to December 19th. These are chiefly botanical. There is also the Annual Report, List of Members, etc. More care than usual has been exercised in the selection of blocks to illustrate these reports; and amongst them is a portrait of the President, Sir William H. Bailey. There are 100 pages of closely-printed matter. The report is largely spoilt with advertisements of pianos, fire-grates, etc. We hope that the pretty lady in the fearful hat, with its firework-like feathers, inserted in the advertisement on the cover, is in order to warn Manchester lady naturalists what *not* to wear!

The Proceedings of the **Cleveland Naturalists' Field Club, 1907-8,** Vol. II., part 3 (2/-) has just been issued. They are edited by the Rev. J. C. Fowler, and may be obtained from the Secretary, at the Dorman Museum, Middlesborough. There are illustrations of the more important objects described, one of which we are permitted to reproduce (see p. 211). Mr. F. Elgee writes at length on his favourite theme, 'The Fauna of Cleveland, Past and Present,' giving an excellent summary of the zoological history of the area; the Rev. G. Lane writes on the local jurassic plants; the editor describes a large boulder of shap granite, an Edward III. counter, and 'An interesting geological discovery;' and there are notes on local coleoptera and lepidoptera by Messrs. M. L. Thompson and T. A. Lofthouse respectively. The 'geological discovery' is unfortunately vague. It appears the stool of a tree, in position, was found under six feet of 'glacial' drift, 'deposited under torrential conditions, and the tree was evidently overwhelmed.' The tree was found 'as it grew in one of the mild inter-glacial seasons,' etc. The tree '*appears to be* oak.' Cannot some local botanist identify the wood, and some local geologist give a more definite date to the overlying drift? And then, with regard to the Edward III. counter found at Whorlton, which 'may have fallen out of the doublet of one of the royal retainers, who might have been sent to the castle on some royal errand,' etc.; the editor has been to infinite pains to ascertain whether Edward III. was ever at Whorlton, and has even searched at the Public Record Office. At present he cannot find that that king was ever there. But surely many coins of Edward VII. are found in situations where that monarch never was? Our Cleveland friends are to be congratulated on their publication.

The Annual Report and Transactions of the North Staffordshire Field Club for 1908-9 (Vol. XLIII.) has just been issued. It contains many interesting papers, as well as an excellent account of a good year's work. Amongst the contributions we notice 'The Evolution of the Cetacean Tail Fin,' by F. W. Ash; 'Lilleshall Hill,' by Dr. Wheelton Hind, and 'The Life History of the River Trent,' by A. M. McAldowie.

ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

Rev. C. E. Y. KENDALL, B.A., J. DAVY DEAN, and
W. MUNN RANKIN, M.Sc., B.Sc.

The distribution of mollusca over a given area, as of other more or less sedentary forms of life, is noticeably discontinuous; the species constituting the fauna being limited within their stations by life conditions favourable to the individuals. The occurrence of a species within a district is not simply a function of the organisation of the individuals, but to a large extent, is one also of the purely physical conditions of the habitat wherein they obtain. Thus regarding a particular area broadly from the view point of an ecologist to whom the life conditions of a species are of interest not second to the taxonomic rank of the form, there is a closed patchwork of wide habitats showing among themselves much diversity, but within an almost uniformity of conditions, upon which the presence of living forms depends.

In addition to this concept of the grouping together or association of physical factors of biological value, there is the further, of the association of species, which in their individuals find the physical inanimate nature more or less advantageous to their manifold activities. The distinguishing of such natural groups, shewing a biological or ecological uniformity, as immediately concerning vegetation, has been the business during many years of several workers, chief among whom in England is Dr. W. G. Smith. Following the methods laid down in his early papers, and those of his brother, the late R. Smith, not only have the Pennine areas—ridge and flank, from the Peak to the Cheviots been marked out into their vegetation associations—but also that district of South Lonsdale with which our theme is immediately connected. The distinguishing of plant associations, whether of the salt marsh, of the woodland, or of the moorland, is distinct from the effort to make as complete a floral list as may be—a worthy and profitable aim in itself—but in its analysis of the physical factors of climate and soil ruling in the station, and of those arising from the struggle of individual with individual and species with species, as well as of both with the station, there is the further effort to make out the mechanism of the broad biological associations of which the plant associations are single examples among several. The floral composition of a particular association of plants is to a large extent the register of the operation of a complex of factors working upon the plant individuals as material, which in the main is previous to and independent of the vegetation. Forms of life, other than plants, which, like them, are more or less 'spot-bound,' would seem to be scarcely less dependent upon the definite physical conditions of these associations. Thus, in taking the various plant associations and formations as the basis of a geographical study of mollusca, there is something more than a convenience. A further bond between the molluscan fauna and the florula holds in the holo- or semi-parasitism, for food and home, of snails upon the vegetation. The many plant associations of first importance which have been recognised in the district of South Lonsdale are here recognised as life-associations and made to serve for a preliminary molluscan survey. It appears to us that the loan of the results obtained in one field of natural science to problems in another is amply justified in the present treatment, as well as in the hope for future work on new lines.

The area taken for consideration lies broadly, as a naturally defined tract of diversified country of hill and valley encircled between the sea in the west and the ranges of highlands in the other quarters—to the north the Cumbrian watershed, to the east the Pennine axis, and to the south the Wyresdale escarpment and slope. It comprises not only the lower basin of the Lune, but also of the several rivers which are properly its tributaries entering the shallow waters of Morecambe Bay. Using the usual bio-geographical terms, it covers much of the vice-counties 60 (West Lancashire), and 69 (South Lake District).

The altitude ranges between sea-level and 3000 feet O.D., so that within the limits of the district there is a wide variation within the climatic factors of mean monthly and diurnal temperature of soil and air, of rainfall, of air humidity etc. There may be instanced the contrast in climate between Grange—suggesting the geniality of a Devon sea-village—and the summit of Ingleboro or High Street, little removed from the Arctic tundra.

The soils have abundant variety. The Silurian and Ordovician rocks of the northern buttress, ecologically, stand intermediate between the Carboniferous Limestone of the eastern scars and the Millstone Grits of the southern fells. On the coast are extensive deposits of estuarine and maritime silts, and within land is an almost universal mantling of glacial drift. In low valley bottoms, remnants of peat moors still continue as relics of the ancient landscape of Lonsdale. Rivers, ditches, pools and the like afford variety of open water, between the soft peaty floods of the mountain becks and the hard clear issues of limestone springs.

Few districts shew a greater variety of vegetation. Of the full series of British marshlands and moorlands few formations are unrepresented. Dry grasslands show all possible variety between the natural pasture of the calcareous rocks and the Calluna heath and moor of the grit and shale fells. In the old times the forests of Quernmore and Lonsdale were doubtless wider spread with woodland, though to-day there is an abundance of naturally occurring woodland of Ash and Oak to which recent forestry has added woods of Beech and Pine.

The classification of the formations or groups of associations into which the district may be divided for purposes of biological research, here made applicable to land and freshwater mollusca, is that derived from a consideration of the vegetation not only of the present district, but of many other parts of Britain. Within the limits of the present paper the responsibility for its employment rests upon Mr. Rankin, while the grouping of the mollusca into associations is that of Messrs. Kendall and Dean.

THE BIOLOGICAL FORMATIONS OF SOUTH LONSDALE.

TYPE OF COASTLANDS.

1. Salt Marshlands.
   Transition to Freshwater Marshlands.
2. Sand-dunes.
   (Not typically developed).

TYPE OF DRY GRASSLANDS.

Calcareous Pastures.
Non-calcareous Pastures and Heaths.

TYPE OF WET GRASSLANDS.

1. Formations of Hard-water Lakes and Ponds.
2. ,, Hard-water Rivers and Streams.
3. ,, Soft-water Lakes and Ponds.
3*a* ,, Canals.
4. ,, Soft-water Rivers and Streams,
5. ,, Heath Moors.

TYPE OF WOODLANDS.

1. Ash Wood Formation.
    - *A*—Damp Ash Wood.
    - *Aa*—Substituted Beech Wood.
    - *B*—Dry (Copse, Pavements, etc.)
2. Oak-Birch Wood Formation.
    - *A*—Damp.
    - *B*—Dry and Heathy.

NOTE.—In this paper we have adopted the nomenclature of the Conchological Society's List of the British Non-marine Mollusca (1904) with the exception of preferring Pupa for Jaminia as the generic name of this group.

COASTLANDS.

§ 1. SALT MARSHLANDS. Sub-halophile.

(*a*)—*Inner zones* (or Reed-formation).

Paludestrina stagnalis Baster. Associated with *Littorina rudis* Maton.

A species existing in countless numbers all round Morecambe Bay, in brackish pools at and above high-water mark. The *L. rudis* is the form known as var. *tenebrosa* Mont., as usual in brackish waters.

(*b*) *Transition to Fresh-water Marsh.* Sub-halophile.

Here the soil-water is at most times fresh, rising from land, though at the periods of very high tides it is brackish.

Succinea oblonga Drap. Associated species :—

LAND.

Agriolimax lævis Müll.
,, *agrestis* L.
Arion circumscriptus Johnston
Vitrea radiatula Alder.
Punctum pygmæum Drap.
Hygromia hispida L.
Cochlicopa lubrica Müll.
Vertigo pygmæa Drap.
Carychium mininum Müll.
Succinea elegans Risso (rare).

WATER.

Limnæa pereger Müll.
,, *truncatula* Müll.
Aplecta hypnorum L.
Pisidium pusillum Gmel.
,, *obtusale* Pfeiffer.

This rare and local species occurs in great abundance near the estuary of the River Winster, at Meathop and towards Grange-over-Sands. In the heat of summer it is to be found at the bottom of the damp drains which intersect the meadows. It is also to be found sparingly among the stones bounding the marshy land, where, in company with *Limnæa truncatula*, it seems able to exist with a minimum of moisture. It occurs in N. Devon about the dune-marshes of Braunton Burrows.

Planorbis umbilicatus (Müller). Associated with :—

Limnæa pereger Müll.
Planorbis spirorbis L.
Aplecta hypnorum L.
Pisidium pusillum Gmelin.

It is the var. *rhombea* Turton of this species which occurs near the Lune Estuary in the drains and ditches which are in all probability subject to an inrush of salt water in flood seasons. Var. *rhombea* also occurs in the salt-marshes of the Thames Estuary, in salt-marshes at Blytheburgh (Suffolk), and in the marshes between Lewes and Newhaven (Sussex).

§ 2. SAND DUNES—Xerophile. None in the district.

DRY GRASSLANDS.

CALCAREOUS PASTURES. Sub-Xerophile and Calco-phile.

1. *Carboniferous Limestone.* (Examples at Silverdale, Grange, etc.).

Pyramidula rupestris Drap. Associated species :—

Agriolimax agrestis L.
Pupa cylindracea da Costa.
And locally
Pupa muscorum L.

This is one of the most characteristic species of the Limestone region, and has an uninterrupted range. It is essentially a Helix of the rock surfaces which it much resembles. Even during the heat of the day it will remain exposed to the sun's rays while the Pupæ retreat into the crevices of the rock or the roots of the grasses. *Pupa muscorum* is more abundant on the lower sea-ward pastures than on the higher ground. *Pyramidula rupestris* with *Pupa cylindracea* is a distinctive feature of Limestone pasture at high altitudes, though *P. rupestris* alone even extends to the summit of Skiddaw (3054 feet) on Ordovician Grits.

Helicella caperata Mont

(*a*) In conjunction with *Thymus serpyllum* is associated with :–

Agriolimax agrestis L.
Arion intermedius Normand (rare).
Helicella itala L.
Hygromia hispida L.

In conjunction with *Tanacetum vulgare* is associated with :—

Agriolimax agrestis L.
Arion ater L.
Vitrea cellaria Müll.
,, *nitidula* Drap.
Hygromia rufescens Penn.
,, *hispida* L.
Helix aspersa Müll.

On the Millstone Grit in conjunction with *Tanacetum vulgare* we find *H. caperata* associated with :—

Agriolimax agrestis L.
Arion ater L.
Hygromia hispida L.
,, *rufescens* Pennant.
Helix aspersa Müll.
,, *hortensis* Müll.
Ena obscura Müll.

As these associations occur near the sea, probably the characteristic species is *H. itala*—with *H. caperata* in Lonsdale as the dominant. For elsewhere one often finds on the dry pastures near the coast, *H. itala* in abundance, associated with *H. virgata, H. caperata* and *H. cantiana*

H. caperata exists in Lonsdale in colonies on the drier seaward pastures, and on the windward (here the *western* side) of calcareous pastures further inland. It is the only species of the Helicella group which can be considered as well established in this district. *H. virgata,* so abundant elsewhere, is entirely absent. *H. itala* seems confined to just a few places, and can rarely be taken in any numbers.

Vallonia excentrica Sterki.

Vertigo pygmæa Drap. (Example—Far Arnside).

These two species will be found in dry weather under loose stones lying in the open pastures at a low level—often in a dry exposed situation. While either species may also be found in the Wet-Grassland or Woodland sections, the above is a characteristic feature in their distribution.

Pupa secale Drap. (Example—Witherslack).

Separating the low-level seaward pastures from the higher wind-swept pavements or grazing lands, there are in some places vertical rock faces often of a considerable height. On several of these occurs *Pupa secale* associated with *Pyramidula rupestris* (as the dominant) and *Pupa cylindracea* da Costa. It is really a southern type, abounding on the calcareous formation and the most northerly station so far recorded is Scout Scar, Kendal. Like *P. rupestris* it seems to need very little moisture. Similarly the southern *Pomatias elegans* finds in the district its most northerly extension, which is paralleled by the distribution of *Asperula cynanchica* and *Clematis Vitalba.*

Sub-section—SUBTERRANEAN..

Caecilioides acicula Müller. (Example—Silverdale).

An isolated species *—

(*To be continued*).

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* Possible association is with *Vitrea crystallina* Müller, a species almost subterranean in its habits, and common in the district.

FUNGI IN THE NEIGHBOURHOOD OF SELBY.

C. CROSSLAND, F.L.S.

On the 22-24th May, Messrs. W. N. Cheesman, Thos. Gibbs, H. C. Hawley and the writer visited Eskrick, Osgodby, Stainer, and Bishop's Woods, in the neighbourhood of Selby. The two former are situate within the S.E., and the two latter within the Mid.-W. divisions of the county, which join near Selby.

The principal object was to search for fungi which only make their appearance in the spring season ; such, for instance, as *Acetabula, Verpa, Gyromitra, Metrophora,* and other uncommon species, as well as *Morchella* and a few of the larger Pezizæ.

Though we did not meet with much success in our special object, we met with no fewer than ninety other species—an exceedingly good haul for the time of the year. When the material gathered was worked through, it was found that four were new to the county Fungus Flora. These are :—

Corticium violaceolividum Fr. On dead branch, Bishop's Wood.
Peniophora pubera Fr. On dead branch. Stainer Wood.
Valsa salicis Cke. (=*Diaporthe salicella* Sacc.). On dead willow-twig, Osgodby Wood.
Gonytrichum caesium Nees. On dead wood, Bishop's Wood.

Besides these, the following were added to the S.E. and Mid.-W. divisions :—

S.E. All Eskrick.

Fomes igniarius
Polyporus chioneus
Lasiosphæria ovina
Ombrophila clavus
Didymella tosta
Heptameria derasa
Dasyscypha fugiens

Mid. W.

Peniophora cinerea, B.W.
,, *hydnoides*, B.W.
Ustilago longissima St. W.
Valsa platanoides, St. W.
Eutypa lata, St. W.
Byssosphæria aquila, B.W.
Heptameria acuta, St. W.
Helotium ferrugineum B.W.
Belonidium pruinosum, St. W. ; B.W.
Ryparobius dubius St. W.
Orbilia luteorubella, B.W.
Melanconium bicolor, B.W.
Cephalosporium acremonium, B.W.
Rhinotrichum repens, B.W.
Periconia pycnospora, B.W.
P. podospora, B.W.
Macrosporium commune, St. W.
Graphium flexuosum, B.W.

B.W.=Bishop's Wood ; St.W.=Stainer Wood.

The Annual Report of the **Yorkshire Philosophical Society** for 1908 has just been received. It contains an admirable and well-illustrated paper on the Samian ware in the York Museum, by Mr. T. May, and also an illustrated paper by Mr. J. Blackhouse on 'A Vanishing Yorkshire Village' [Kilnsea]. We notice [p. 13), that an addition has been made to Robinson's 'East Riding Flora' by the discovery of the Marsh St. John's Wort, at Buttercrambe. This should read 'an additional locality' only

FIELD NOTES.

MOLLUSCA.

A new Lincs. locality for *Paludestrina confusa*.—On Bank Holiday (August 2nd) Mr. V. Howard, M.A., and the writer searched the marsh drains at Theddlethorpe St. Helen for freshwater mollusca. In a drain running at right angles to, and about a furlong distant from, the sandhills near the old brickyard, we found *Paludestrina confusa* in abundance. This locality, though in the same division (9) as Saltfleetby, where this species was previously found, is about two-and-a-half miles distant southward.—C. S. CARTER, Louth,

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BIRDS.

Cuckoo reared by a Wagtail.—In a coal-yard adjoining the Horncastle Railway Station, and a few yards from the canal, a porter observed a Cuckoo apparently incubating on the ground. He afterwards examined the spot, and found a Cuckoo's egg laid in the nest of a Wagtail among fragments of coal. He continued to keep the nest under observation, and the young Cuckoo was eventually hatched, and reared by the Wagtail, until it was strong enough to fly away. This was early in July.—J. CONWAY WALTER. Langton Rectory, Horncastle.

Occurrence of the Little Gull in Northumberland.—A Little Gull, in unusual immature plumage, was seen by Messrs. H. B. Booth, G. A. Booth, and myself, in the harbour at Seahouses on the evening of July 18th. When first seen it was swimming in company with a party of Black-headed Gulls, though keeping itself somewhat aloof from them. It flew round about, and quite close to us several times, then flew on to the rocks at the south of the harbour, and settled there. After a little time it again flew into the harbour, and after circling round once or twice, disappeared in the direction of Bamborough. The plumage, with the exception of the head being darker, was like the figure in Dresser's 'Birds of Europe.'—R. FORTUNE.

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BOTANY.

***Ricciocarpus natans* L.**—I collected this plant near Doncaster last June in a pond among *Scirpus lacustris*. It grew best and almost pure when well shaded ; in some places *Lemna trisulca* was associated with it, but in the more open parts of the pond the *Lemna* was much more abundant, the *Ricciocarpus* being here absent.—W. WEST.

COLEOPTERA.

***Gracilia minuta* F. in Yorkshire.**—As mentioned in an editorial footnote, in reply to a query by Mr. J. F. Musham ('Nat.', Aug. 1909, p. 303), *G. minuta* was taken and brought to me last year by Mr. F. Booth, both at Thackley, near Bradford, and at Clapham; and in each case from umbelliferous flowers. In both instances I think, there can be no doubt about the species being indigenous. Mr. Booth diligently secures for me all the species of coleoptera which come in his way when collecting mollusca, and by this means has added many interesting species to our local list.

Some time ago Mr. F. Bamford gave me a number of specimens of *G. minuta* which he had found emerging from some new wooden bobbins at the great silk factory—Lister & Co., Ltd.—at Manningham. In this case I think we must write them down as probably introduced with the timber from which the bobbins were made.—J. W. Carter, Bradford.

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ERRATIC BOULDERS AT BARDNEY ABBEY.

F. M. BURTON, F.L.S., F.G.S.

In the excavations at Bardney Abbey which, through the agency of the Rev. C. E. Laing are now being carried out, three boulders are exposed, which had been utilised by the old builders of the Abbey as corner stones in making its foundation. All three are from the Spilsby Sandstone, similar to the four unfossiliferous boulders recently described by me in this year's volume of 'The Naturalist,' page 93.

One of these boulders is a 'squared' stone let into the N.W. buttress of the Abbey, 3 ft. 11 in. long × 1 ft. 4 in. broad and 1 ft. 4½ in. deep.

Another, also 'squared,' forms part of the S.W. corner of the Abbey, and measures 1 ft. 9 in. in length × 5 in. in breadth, and is 10 in. deep.

Close by it is a third small boulder, let in near this last one, which measures 1 ft. 3 in. × 9 in.

There is a fourth unworked boulder from the same source—the Spilsby Sandstone—lying imbedded in the open field near the Abbey. This measures 4 ft. 8 in. in length × 3 ft. 4 in. in breadth, and is, probably, about 2 or 3 ft. deep, like the boulders already described in the paper above referred to.

THE PHYTOPLANKTON OF THE ENGLISH LAKE DISTRICT.

WM. WEST, F.L.S.,
AND
G. S. WEST, M.A., D.Sc., F.L.S.,

(*Continued from page 292*).

FLAGELLATA.

23. MALLOMONAS LONGISETA Lemm. in Arkiv för Botanik utgifv. af K. Sv. Vet.-Akad. Bd. 2, No. 2, 1904, p. 118.

This Flagellate was observed in Brothers' Water, Easedale Tarn, and Windermere ; and in the first-mentioned lake it was the dominant constituent of the September plankton. Long. cell, 29.5-37 μ ; lat. cell, 17-21.5 μ ; long. spin., 54-62 μ. It is known in the plankton of the Scottish lakes, but this is the first English record. The spiny covering is particularly conspicuous in this species, and the cell possesses a single brown parietal chromatophore and one flagellum.

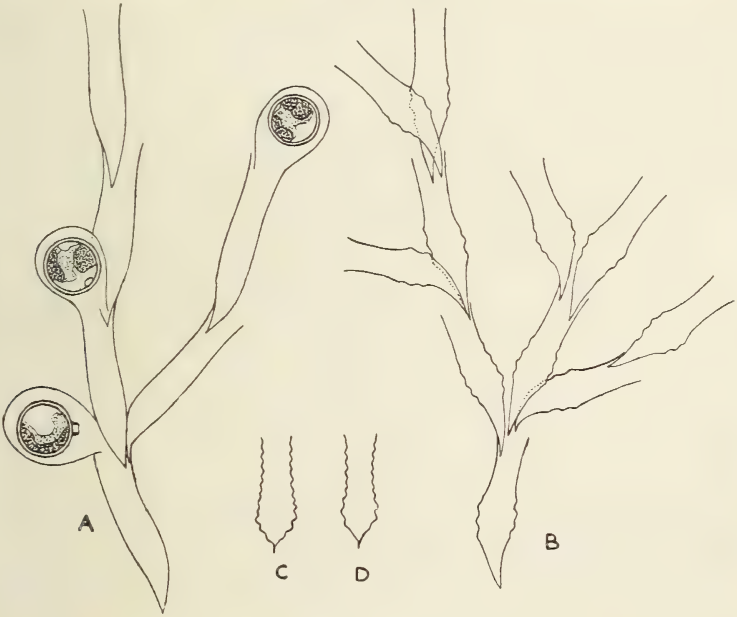

FIG. 7. A., *Dinobryon cylindricum* Imhof, from the plankton of Crummock Water, showing three resting spores ; B., *D. cylindricum* var. *divergens* (Imhof) Lemm., from the plankton of Derwent Water ; C. and D., *D. crenulatum* sp. n., from the plankton of Ennerdale Water. All × 500.

24. DINOBRYON CYLINDRICUM Imhof. This colonial Flagellate is general in the plankton of all the British lake-areas. It was the dominant feature of the May plankton of Crummock Water, and a large proportion of the cells had formed resting-spores (*vide* fig. 7 A). These were first described and figured by Lemmermann (in 'Forschungsber. Biol. Stat. Plön,' XI., 1904, p. 307, fig. 3, 4). Diam. of outer wall or membrane, 9-11.5 μ; length, 48-59 μ; diam. resting spor., 13-14 μ.

Var. DIVERGENS (Imhof) Lemm. in 'Ber. Deutsch. Botan. Ges.', XVIII., 1900, p. 517, t. 19, f. 15-20. *D. divergens* Imhof. *D. Sertularia* var. *undulatum* Seligo. *D. subdivergens* Chodat. *D. divergens* var. *levis* Garbini.

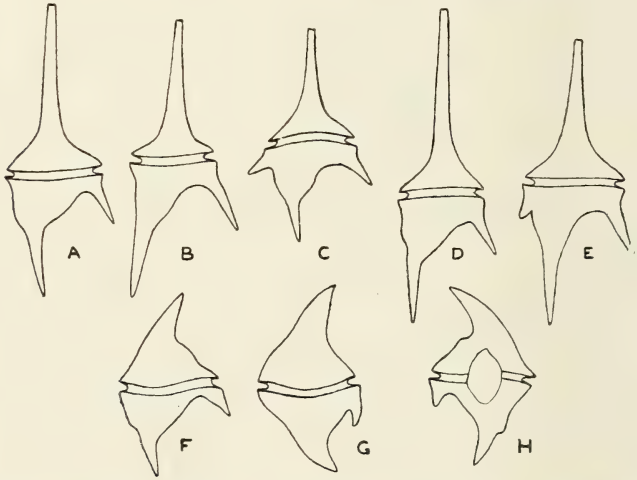

FIG. 8. A.–E., *Ceratium hirundinella* O. F. Müller. All dorsal views. A., from Derwent Water; B., from Brothers' Water; C., from Windermere; D., from Ennerdale Water; and E., from Ulleswater.

F.–H., *C. cornutum* (Ehrenb.) Clap. & Lachm.; F. and G., dorsal views; H., ventral view; F., from Grasmere; G. and H., from Brothers' Water. All × 200.

This variety is the most abundant of all the Dinobryons in the British plankton, occurring both more commonly and in greater quantity than typical *D. cylindricum*. The membrane of the individual cell is very characteristic, and so is the general disposition of the colony. (Consult plate VI., and text-fig. 7 B). The June plankton of Derwent Water consisted mostly of immense quantities of this form. In some of the specimens, more especially those from Stickle Tarn, the upper part of the outer wall was undulate almost as in var. *Schauinslandii* Lemm.

25. Dinobryon crenulatum sp. n. (Fig. 7 c and d). Membrana evacuata firma et hyalina, elongato-campanulata, parte basali leviter dilatata et in stipitem tenuem brevem producta, lateribus leviter concavis; margine toto undulato-crenulato, crenulis 9-12 utrobique.

Long. cum. stip. 31-32 μ; long. stip. 2 μ; lat. bas., 9.5-10 μ; lat. med., 7.5-8 μ; lat. oscul., 8-8.5 μ.

Hab. In the plankton of Ennerdale Water (May 1903).

Only solitary individuals of this species were seen, and we have no evidence to show that colonies are ever formed. It differs from all the known species in its completely crenulate wall from base to apex.

Peridinieæ.

26. Ceratium hirundinella O. F. Müller. This species is the most generally distributed of all the Peridinieæ in the British freshwater plankton. There is a strange absence from the English lakes of the common four-horned form which is so plentiful in the Scottish and Irish lakes (consult 'Trans. Roy. Soc. Edin.', XLI., 1905, part III., p. 494, fig. 1 c and d; and 'Trans. Roy. Irish Acad.', XXXIII., sect. B. 1906, part II., p. 94, figs. 6-8). The only four-horned form observed occurred in Windermere, and all the horns were stunted, especially the apical horn (Fig. 8 C). A form similar to this has been observed by Bachmann in the Thunersee, and also in the Zugersee, in Switzerland. All the other forms seen were three-horned, except those from Ulleswater and Hawes Water, which possessed a trace of the fourth horn (fig. 8 e). The commonest forms observed were three-horned, with the median antapical horn disposed parallel to the longitudinal axis.

In no single instance was *Ceratium hirundinella* observed abundantly in the English lakes. It is general and frequent, but does not appear to form large maxima.

27. Ceratium cornutum (Ehrenb.) Clap. & Lachm. This species is much less frequent than the preceding, and was only observed from Brothers' Water and Grasmere (fig. 8 F-H). There is much variability in the curvature of the horns, and we are inclined to believe that *C. curvirostre* Huitfeldt-Kaas is only a form of it.

28. Peridinium Willei Huitfeldt-Kass in 'Vidensk. Skrifter,' 1900, No. 2, p. 5, fig. 6-9; Börg. & Ostenf. in 'Botany of the Faeröes,' 1903, p. 622, fig. 150; Lemm. in 'Archiv fur Hydrobiol. u. Planktonkunde,' III., 1908, p. 376,

figs. 13-16; *P. alatum* Garbini in ' Zool. Anzeig.', 1902, p. 122, fig. A, B.

This is the only generally distributed species of the genus *Peridinium* in the English Lake District. It was found in almost all the lakes examined, and often occurred in large quantity, being much more abundant than in any of the other British lake-areas. Like *Ceratium hirundinella*, it is a summer form, with its maximum in August. Long. 56 μ; lat. 60-64 μ; crass. max. 44-47 μ. (Text-fig. 4 A—G).

P. Willei is a very distinct species, and maintains its characters very constantly. The group of five small apical plates, forming the extreme anterior margin of the epivalve, is one of its principal features. These plates vary within certain limits, but are very constant in their position (*vide* fig. 4 A-C). Another of its features is the possession of two small wing-like extensions of the ventral margins of the antapical plates. Each of these is furnished with a number of very short and delicate spines, and they are best seen when the cell is very slightly oblique. The plates are rather finely areolated, the areolations gradually becoming more pronounced as the age of the cell increases.

V.—THE PECULIARITIES OF THE ENGLISH LAKE-PLANKTON.

The phytoplankton of the English Lakes contains a varied assortment of Algæ, 64 per cent. of which belong to the Chlorophyceæ, 21 per cent. to the Bacillarieæ, and only 9.5 per cent. to the Myxophyceæ. Thus, the phytoplankton is essentially Chlorophyceous, with a plentiful admixture of Diatoms, and but a few Blue-green Algæ.

		Species.	Varieties.
Chlorophyceæ	Desmidiaceæ ..	96	13
	Remainder (excl. Desm.) ..	24	2
Bacillarieæ	.. .. ..	41	3
Myxophyceæ	.. .. ..	17	0
Flagellata ..	.. .. ..	4	2
Peridinieæ	.. .. ..	6	0
	Total	188 species	20 vars.

Of 120 species of Chlorophyceæ, 96 are Desmids, so that 51 per cent. of all the species recorded for the plankton belong to the Desmidiaceæ. In some of the lakes Desmids are abundant, but they rarely occur in such prodigious quantities as certain species of Diatoms and Flagellates, although the May plankton of Ennerdale Water, and also of Easedale Tarn, was for the most part a Desmid plankton. Notwithstanding the fact that the English Lakes contain a *high percentage of species*, taken generally, they are not so rich in actual *numbers* of Desmids as the Scottish or Welsh lakes. The most frequent Desmids are: *Staurastrum anatinum, St. Arctiscon, St. curvatum, St. jaculiferum, St. lunatum* var. *planctonicum, C. subtumidum* var. *Klebsii, Xanthidium antilopæum* and vars., *Arthrodesmus Incus, A. triangularis*, and *Spondylosium pulchrum* var. *planum*. In the plankton of some of the lakes, and especially in that of Brothers' Water, *St. Arctiscon* is abundant.

Staurastrum sexangulare was present in the plankton of Ennerdale Water, and *St. Ophiura* in Easedale Tarn.

St. Ophiura is a feature of the plankton of many of the Scottish,* Welsh, and Scandinavian lakes; † and its occurrence in the plankton of Easedale Tarn is very interesting.

Until British plankton-investigations were started about eight years ago, both *St. Arctison* and *St. Ophiura* were regarded as amongst the rarest of British Desmids. It is now known that both occur in myriads in the plankton of certain lakes, whereas they are very rarely found in the surrounding bogs, or even at the boggy margins of the lakes in which they occur. The occurrence of *Micrasterias pinnatifida, M. radiata*, and *M. mahabuleshwarensis* var. *Wallichii* is also of great interest in comparison with the plankton of the other British lake-areas.

The general abundance of *Spondylosium pulchrum* var. *planum* deserves special emphasis. It also occurs abundantly in the Scottish and Irish lakes. Bachmann has recorded the occurrence of '*Spondylosium pulchrum*' in several Scottish lochs,‡ but in this he is wrong. Typical *Spondylosium pulchrum* does not occur in the British Islands, but Wolle's var. *planum*, which is much smaller, more regular, and without any twist in the filaments, is quite common in the British plankton.

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* W. & G. S. West in 'Journ. Linn. Soc. Bot.', XXXV., Nov. 1903, pp. 530 and 550; in 'Trans. Roy. Soc. Edin.', XLI., 1905, p. 487.

† Lemmermann, 'Das Plankton Schwedischer Gewässer,' Arkiv. för Botanik utgifv. af K. Sv. Vet.-Akad. Bd. 2, No. 2, 1904; Huitfeldt-Kaas, 'Planktonundersögelser,' I., Norske Vande, Christiania, 1906.

‡ Bachmann, *loc cit.*, 1907, pp. 21, 26, 27, 30, 88.

The British lakes are remarkable beyond all other European lakes (with the possible exception of the Scandinavian) in the richness of their Desmid-flora. We have elsewhere discussed the possible connection between this abundance of Desmids and the Older Palæozoic and Precambrian strata which form the great mass of the rocks constituting the drainage-basins of so many of these lakes. It also seems highly probable that the chief determining factor in this richness is a chemical one.

Bachmann, in his remarks upon the Desmids of the Scottish plankton, makes the mistake of generalising from a few samples. He states that Desmids seldom form a dominant feature of the plankton, and that a Desmid-plankton is only characteristic of small lakes. Both these statements are quite erroneous concerning the plankton of any of the British lake-areas

The following table will give some idea of the abundance of Desmids in the British lakes as compared with some of the lakes of Continental Europe. The numbers are percentages of the total species observed in the phytoplankton. The percentages of Bacillarieæ and Myxophyceæ are also given for comparison.

LAKE-AREAS	DESMIDIACEÆ	BACILLARIEÆ	MYXOPHYCEÆ
Scottish	49·4%	17·7%	8·7%
Irish	41·7%	19·0%	13·3%
Welsh	62.4%	11.1%	7·4%
English	51.0%	21.0%	9·5%
Swiss*	12 %	29 %	13 %
Scandinavian*	27 %	22 %	12 %

In the English lakes there are relatively few Protococcoideæ, and no species can be described as common. *Glœocystis gigas* and *Sphærocystis Schroeteri* are the most generally distributed species, but even they are rarely abundant. There is an entire absence of *Pediastrum simplex* and *P. duplex,* and also of the genus *Kirchneriella.*†

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* The percentages given for the Swiss and Scandinavian lakes are only approximate. The percentages of the three groups in the German lakes have not been accurately ascertained, but the percentage of Desmidiaceæ is low (under 10%) whereas the percentages of Bacillarieæ and Myxophyceæ are very high.

† The absence of *Kirchneriella* from the plankton of the English lakes is rather remarkable, as the commonest British species—*K. obesa* W. & G. S. West (in 'Journ. Roy. Micr. Soc.', Feb. 1894, p. 16)—was first described from small ponds near Bowness under the name of '*Selenastrum obesum*' (*vide* West, *ibid.*, Feb. 1892, p. 22).

The Diatoms are very conspicuous in the plankton of some of the English lakes, and although they are represented by only one third as many species as the Chlorophyceæ, they are often the dominating constituents. Especially noticeable are *Asterionella gracillima,* the two species of *Tabellaria,* and *Melosira granulata.*

Gomphonema geminatum occurred in fair quantity in the plankton of Wastwater and of Hawes Water. We have also recorded it quite common freely floating in Loch Tay.* This species is normally attached and can be obtained in pure masses in many of the mountain cataracts. Numerous individuals evidently get washed down by heavy rains into the limnetic region of the lakes, where they live for some time before perishing.

The Myxophyceæ are almost as poorly represented as in the Scottish lakes, the number of species being relatively few. *Cœlosphærium Kützingianum* attained considerable abundance in both Crummock Water and Hawes Water, but the genera *Lyngbya* and *Anabæna* were barely represented, and species of *Oscillatoria* were not frequent.

Among the Flagellates the genus *Dinobryon* is conspicuous, and so far as the English lakes are concerned, *D. cylindricum* and its var. *divergens,* are much the most abundant forms. At the end of May and beginning of June, the three lakes, Derwent Water, Crummock Water and Grasmere, possessed a *Dinobryon*-plankton (*vide* plate VI.). In Windermere the maximum of *Dinobryon cylindricum* was in September

Mallomonas longiseta occurred in great abundance in September in Brothers' Water, whereas the same organism attained a decided maximum in December in Windermere.

The most conspicuous member of the Peridinieæ is *Peridinium Willei.* This organism is abundant in nearly all the lakes, and occurs in much greater quantity than in either the Scottish or Irish lakes. It is one of the leading features of the plankton of the English Lake District.

Among the numerous species recorded as constituents of the phytoplankton of the English lakes, some are *true constituents,* either not occurring elsewhere in the drainage-areas of the lakes, or occurring much more abundantly in the plankton than in any other situations. The remainder are only

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* *Vide* 'Trans. Roy. Soc. Edin.', Vol. XLI., part III., 1905, p. 491.

casual or adventitious constituents, washed into the lakes by the rains, and there either perishing very rapidly, or existing for a more or less extended season. As stated before, it is our previous detailed acquaintance with the general Alga-flora of the drainage basins which has enabled us to clearly recognise the true plankton-constituents from those which are casually introduced by the drainage into the lakes.

The following species and varieties are exclusively confined to the plankton:—*Micrasterias mahabuleshwarensis* var. *Wallichii, M. radiata, Cosmarium abbreviatum* var. *planctonicum, C. capitulum* var. *groenlandicum, Xanthidium antilopæum* vars. *depauperatum* and *triquetrum, X. subhastiferum* var. *Murrayi, Arthrodesmus crassus, A. triangularis* var. *subtriangularis, Staurastrum curvatum, St. cuspidatum* var. *maximum, St. jaculiferum, St. longispinum, St. lunatum* var. *planctonicum, St. Ophiura, St. pseudopelagicum, Spondylosium pulchrum* var. *planum, Ankistrodesmus Pfitzeri, Elakatothrix gelatinosa, Oocystis lacustris, Sphærocystis Schrœteri, Tabellaria fenestrata* var. *asterionelloides, Asterionella gracillima, Rhizosolenia morsa, Anabæna Lemmermanni, Oscillatoria Agardhii, Gomphosphæria lacustris, Microcystis æruginosa, M. incerta, Mallomonas longiseta,* and *Ceratium hirundinella.*

The following are much more abundant in the plankton than elsewhere:—*Euastrum verrucosum* var. *reductum, Micrasterias Sol, Cosmarium depressum, C. subtumidum* var. *Klebsii, Staurastrum anatinum* and vars., *St. Arctiscon, St. Brasiliense* var. *Lundellii, St. denticulatum, St. furcigerum, St. paradoxum* var. *longipes, St. sexangulare, Botryococcus Braunii, Cyclotella compta, Melosira granulata, Fragilaria crotonensis, Asterionella formosa, Surirella robusta* var. *splendida, S. biseriata, Lyngbya bipunctata, Cœlosphærium Kützingianum, Microcystis pulverea,* and *Peridinium Willei.*

It is particularly noticeable in the English Lake District that a greater bulk of plankton occurs in those lakes which are slightly contaminated by the presence on their shores of small villages and farms than in those lakes free from contamination. The greater bulk of plankton-organisms is most probably due to the slight increase in the amount of food-constituents, especially nitrates, consequent upon the slight sewage contamination.

We have no evidence in support of the view put forward by Huitfeldt-Kaas* that small depth is favourable and great depth unfavourable to the development of plankton. On the contrary, there is a very considerable phytoplankton and zooplankton in Loch Morar, Inverness,† which is not only the deepest lake (1017 feet) in the British Islands, but the eighth deepest lake in Europe. Likewise the great African lakes have an enormous phytoplankton,‡ with a depth exceeding 1300 feet in Tanganyika, of 1200 feet in Lake Nyasa, and of 620 feet in Victoria Nyanza. Many facts tend to prove that the presence of available food-constituents in the form of dissolved salts is the principal determining factor in the quantitative development of plankton, and that this may result from several causes, not the least of which is the slight sewage contamination in so many of the European lakes.

DESCRIPTION OF PLATE V.

Photomicrographs of Plankton from Ennerdale Water (× 100).

1 and 2, *Peridinium Willei*; 3 and 4, *Ceratium hirundinella*; 5, *Xanthidium antilopæum* var. *depauperatum*; 6 and 7, *Staurastrum dejectum*; 8, *St. jaculiferum* (biradiate form undergoing division).

9-11, *Peridinium Willei*; 12, *Ceratium hirundinella*; 13 and 14, *Staurastrum curvatum* (or *St. dejectum*?); 15, *St. longispinum*; 16, *St. jaculiferum* (biradiate form); 17, *St. furcigerum.*

DESCRIPTION OF PLATE VI

Photomicrographs of Plankton from Crummock Water (×100) and from Derwent Water (×200).

1 and 2, *Dinobryon cylindricum* (with immature resting spores); 3, *Melosira granulata*; 3, Stout form of *Staurastrum anatinum.*

5 and 6, *Dinobryon cylindricum* var. *divergens*; 7, *Cyclotella compta.*

DESCRIPTION OF PLATE VII.

Photomicrographs of Plankton from Windermere (×100), Upper Photograph of June Plankton, and Lower one of September Plankton.

1 and 2, *Asterionella gracillima*; 3, *Tabellaria fenestrata* var. *Asterionelloides.*

4, *Asterionella gracillima*; 5, *Tabellaria fenestrata* var. *asterionelloides*; 6 and 7, *Xanthidium subhastiferum* var. *Murrayi*; 8, *Spondylosium pulchrum* var. *planum*; 9 and 10, *Staurastrum paradoxum* var. *longipes*; 11, *St. jaculiferum.*

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* Huitfeldt-Kaas, *l.c.*, 1906, p. 185.

† W. & G. S. West in 'Trans. Roy. Soc. Edin.', Vol. XLI., part III., 1905, p. 481 *et seq.*

‡ G. S. West in 'Journ. Linn. Soc. Bot.', XXXVIII., 1907, pp. 81-192.

CORNICULARIA KOCHII CAMB.—A SPIDER NEW TO GREAT BRITAIN.

WITH A KEY TO THE BRITISH CORNICULARIÆ.

WM. FALCONER,
Linthwaite, Huddersfield.

(*Continued from page 298*).

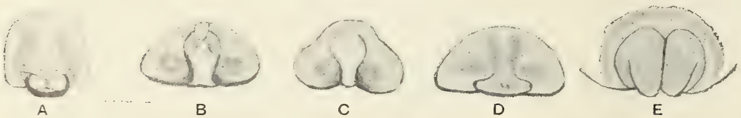
(*b*) Limbs of apophysis converge. Inner limb without a basal tooth .. .. Karpinskii Cambs.

B.—Ocular area without a tubercle. Tibial apophysis undivided.

I. Legs reddish. Posterior eyes equidistant .. Vigilax Bl.

II. Legs bright orange yellow. Posterior central eyes nearer to each other than to the laterals .. Lucida Camb.

FEMALES.



Vulvæ.

[Figs. A to D viewed from above, fig. E from front].

A.—Sternum without punctate impressions.

I. Profile of cephalothorax, with a slight hollow. Clypeus equals one-half the facial space, not projecting at lower margin. Falces not protuberant at base. Tibia of first pair of legs incrassate .. .. Pavitans Camb.

II. Profile of cephalothorax with a deeper hollow. Clypeus higher and projecting at lower margin. Falces protuberant at base. Tibia of first pair of legs not incrassate .. .. Pudens Camb.

B.—Sternum with punctate impressions.

I. Impressions distinct and deep, covering the whole surface of the sternum. Vulva fig. B. .. Unicornis Camb.

II. Impressions much less distinct and shallow, the centre of sternum being nearly clear ..

(*a*) Posterior eyes equidistant.

(i) Eyes fairly large. Posterior central eyes not more than one diameter apart. Vulva, fig. A. .. Cuspidata Bl.

(ii.) Eyes smaller. Posterior central eyes $1\frac{1}{2}$ diameters apart. Vulva, fig. D. .. .. Vigilax Bl.

(*b*) Posterior central eyes closer to each other than to laterals of same row. Eyes rather small

(i.) Larger. Posterior central eyes fully 1 diameter apart. Vulva, fig. C. .. .. Kochii Camb.

(ii.) Smaller and slenderer. Posterior central eyes less than 1 diameter apart. Vulva, fig. E. .. .. Karpinskii Camb.

Figures of *Cornicularia lucida* Camb. ♂, Plate XXXV., fig. 27, and of *C. pavitans* and *C. pudens* Camb. females, Plate XLVI., figs. 13 and 15, may be found in Vol. XXVIII. of 'The Transactions of the Linnæan Society.'

Naturalis

REFERENCES TO PLATE XVII.

Drawings by F. P. Smith.

Fig. 1.—*C. Kochii* Camb. Ocular tubercle and eyes viewed in profile.

Fig. 2.—*C. kochii* Camb. The same viewed from above.

Fig. 3.—*C. kochii* Camb. The same viewed from front.

Fig. 4.—*C. kochii* Camb. Tibial joint and apophysis from above. *a*—tooth of inner limb. ; *b*—branch of the outer limb.

Fig. 5.—*C. kochii* Camb. Part of the left palp viewed from the outside. *a*—C-shaped process at base, and *b*—the circular spine at the extremity of the palpal organs ; *c*—another view of the tibial joint and apophysis.

Fig. 6.—*C. unicornis* Camb. Tibial joint and apophysis from above. *a*—tooth of inner limb.

Fig. 7.—*C. unicornis* Camb. Ocular tubercle and eyes viewed from front.

Fig. 8.—*C. karpinskii* Camb. Tibial joint and apophysis viewed from above.

Fig. 9.—*C. karpinskii* Camb. Ocular tubercle and eyes viewed from front

REFERENCES TO VULVÆ.

W. Falconer.

A.—*C. cuspidata* Bl. B.—*C. unicornis* Camb. C.—*C. kochii* Camb.
D.—*C. vigilax* Bl. E.—*C. karpinskii* Camb.

◆

Memorials of Old Lancashire. Edited by **Lt.-Col. Fishwick** and **Rev. P. H. Ditchfield.** Bemrose & Sons, Derby. 2 volumes, 280 and 314 pp., 25/- net.

It would be difficult to find a greater contrast than between the Lancashire, so charmingly described in these beautiful volumes, and the Lancashire one sees from the railway carriage windows whilst travelling through that county to-day. But the difference is due to the fact that the books deal with *old* Lancashire ; and also to the circumstance that in walking through these old fields, we have as guides such well-known and well-informed antiquaries as Col. Fishwick and the Rev. Ditchfield. Both these gentlemen have made the past history of Lancashire their special study ; and are consequently the best qualified of editors. They have also written a good share of the chapters. Amongst many other contributors we notice the names of Dr. J. C. Cox, Prof. Collingwood, and Mr. Aymer Vallance.

We can quite understand that in dealing with a county like Lancashire, it was impossible to confine the matter to a single volume, as is the case with most of this series. The marvel is that so much has been included in these two. Col. Fishwick leads off with ' Historic Lancashire ' ; this is followed by a concise and carefully-written account of ' The Romans in Lancashire ', in which are figured the well-known bronze helmet and gold fibula found at Ribchester. Now that the Roman occupation of the county is to the fore, this summary is especially opportune. Cartmel Priory, the Old Church of Manchester, Lancashire Legends, Castles and Fortified Houses, Old Wigan, Furness Abbey, The Crosses of Lancashire, Heysham, Roods, Screens and Lofts, Ancient Fonts, etc., etc., are some of the subjects dealt with in the thirty odd chapters. The value of the volumes is considerably increased by the wealth of carefully-chosen illustrations, and there is a good index. The books are well printed on good paper, and are nice to handle—a yearly rarer feature with books of this character.

1909 Sep. 1.

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The **Transactions of the East Riding Antiquarian Society,** Vol. XV., have just been published. It includes a lengthy and valuable paper by Dr. C. Cox on 'A Poll Tax of the East Riding'; Col. P. Saltmarshe writes on 'Some Howdenshire Villages'; the Rev. A. N. Cooper tells 'How Rowley in Yorkshire lost its Population in the Seventeenth Century, and how Rowley in Massachusetts was Founded,' and Mr. Sheppard contributes Local Archæological Notes, with illustrations. **The Bradford Antiquary,** N.S., Part XII., contains 'The Forgotten Manor of Exley,' by Mr. W. A. Brigg; 'The Laycocks of the Parish of Kildwick,' by Messrs. J. A. and J. B. Laycock, 'West Riding Cartulary.' by Mr. C. A. Federer, and several shorter items of local interest.

In the Transactions of the **Leicester Literary and Philosophical Society** (Vol. XIII., part 1) are two papers of special interest to our readers, viz., 'The Cryptogamic Flora of Leicestershire,' by Mr. A. R. Horwood, a valuable compilation; and 'Desert Formations with Reference to the Origin of the Trias,' by the late Joseph Lomas. This paper is the last contribution by that gifted worker, and was delivered by him whilst on his way from Liverpool to Algeria, the news of his death being received only a week after he was at Leicester.

The Memoirs and Proceedings of the **Manchester Literary and Philosophical Society** (Vol. LIII., part 2) contains several papers of great interest. Prof. A. Schwartz and Sir Hugh R. Beevor write on 'The Dawn of Human Intention: an experimental and comparative study of Eoliths,' in which they make out a good case for the artificial origin of these objects; Mr. J. W. Jackson describes the pre-historic implements found in Irish Diatomaceous Deposits; Prof. Weiss refers to the submerged vegetation of Lake Windermere as affecting the feeding-ground of fish, and also writes on 'The Occurrence and Distribution of some alien Aquatic Plants in the Reddish Canal'; and Mr. F. Stubbs contributes some interesting notes on 'The Use of Wind by Migrating Birds.'

Transactions of the Carlisle Natural History Society, Vol. I., 1909, 150 pp. We should like to congratulate the Carlisle Society upon its first publication. It is ideal, and might well be held up as a model to other societies issuing Transactions. All the papers it contains are strikingly local in character; all are useful; there is no 'padding,' and there is evidence of careful and conscientious editing; though the editors' names are not given. A brief 'Introduction' gives a history of the Society. Mr. J. Murray writes a Memoir of T. C. Heysham—'A Bygone Cumberland Naturalist,' and on 'The Land and Freshwater Shells of Cumberland; Mr. W. E. B. Dunlop contributes some interesting Westmorland Ornithological Notes; Mr. H. Britten writes on 'The Mammals of the Eden Valley'; Mr. T. S. Johnstone contributes part I. of 'Plant Life Around Carlisle'; Mr. T. L. Johnston gives an account of 'The Diving Birds of the Solway'; and Mr. L. E. Hope writes on the Gulls and Wading Birds of the same area. 'The Butterflies of Cumberland' is the title of a paper by Mr. G. B. Routledge, and Mr. F. H. Day writes on 'The Fauna of Cumberland in Relation to its Physical Geography,' and also contributes part I. of 'The Coleoptera of Cumberland.' It is interesting to note (pp 3-4) that 'In 1842, Robert Dunn, of Hull, wrote to Heysham, offering him two skins of the Great Auk for £7 10s. each, and in 1840, Mr. Proctor offered him the egg of the same bird for £3. Unfortunately none of these were secured.' We know nothing about Mr. Proctor, but Mr. Dunn has since died!

The Report of the **Perthshire Natural History Museum** for 1908-9 records the progress made at that institution during the year, and also includes a list of additions, and a valuable Meteorological Report by the Curator, Mr. Alex. M. Rodger.

Lincolnshire Naturalists' Union Transactions, 1908 [publ. 1909]. Louth, pp. 219-322.

Though there is no indication of this being part of any particular volume, it is evident from the paging that this is a continuation of the publication issued by the Lincolnshire Union, which we are glad to find has more money than it knows what to do with. Personally, however, we would rather have seen the spare funds handed over to the needy and deserving county museum than have seen them wasted in printing papers that were not worth the expense, or which had already previously been printed—in the same Society's Transactions, in fact. That the first volume was not, perhaps, quite up to the standard of the present series has nothing to do with it. The present part opens with a charming portrait of a past president of the Lincolnshire, as well as of the Yorkshire Naturalists' Union, the Rev. Canon W. Fowler ; and the photographer seems to have caught him just as he was telling the story about 'Are you drawin' t'cat or am I ? ' The Rev. F. L. Blathwayt writes some useful 'Notes on the Birds of a Ballast Pit,' and Mr. G. W. Mason contributes part II. of 'Lincolnshire Lepidoptera,' which, together with 'Lincolnshire Coleoptera,' by Rev. A. Thornley and Dr. W. Wallace, are exceedingly valuable contributions to the insect fauna of the county. Mr. W. Denison Roebuck, the President of the Union, gives a valuable 'Census of Lincolnshire Land and Freshwater Mollusca to end of 1908.' Mr. F. M. Burton's paper, though interesting, was read to and published by this same society fifteen years ago. The Rev. A. Hunt's paper, being a Presidential address, presumably *had* to be printed ; though if the practice of prefacing papers by lists of pamphlets previously written by an author becomes universal, there will be some interesting developments. There are some shorter notes by other writers. The publication includes 'Field Meetings, 1908,' which (fortunately) are anonymous. A reviewer last year drew attention to the carelessness as regards proof-reading, but, apparently without avail. Not only are the misprints many, but the composition is really shocking. * In four lines we find '*theeolian* sands,' *hippotamus* and *rhinocerus* ; Cuicus, hederoce*ns*, Low for *Sow*, etc., etc. 'All these are confined to limited areas and rare.' The Wild Birds' Eggs' Act is apparently not in force in Lincolnshire, as 'Mr. Coward was highly complimented on the splendid work [collecting eggs] he had done, for he had only been *collecting a few seasons* ' ! '*It* formed an interesting exhibit until *they* developed into *the perfect insect* ' ; 'Mrs. and Alderman Jessop conducted *his* visitors ' ; '*an* habitat,' etc. At Sleaford 'the *Rev*. W. W. Mason "*took*" *the list of plants* ' ; we hope he's returned it. We were not previously aware that a well-known Leeds conchologist was 'F.G.S.,' and there are some peculiar 'officers,' though they are 'sectional.' Amongst these are 'Boulders,' 'Fungi,' and 'Phœnogamic [*sic*] Secretary.'—R.

We have received the Thirty-second **Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society.** St. Albans, 1909, price 2/-.

Besides the usual rules, list of members, balance sheet and report of the Society's year's work, (which is a very good one), it contains 'A Preliminary Catalogue of the Hemiptera-Homoptera of Lancashire and Cheshire,' by Oscar Whittaker, in connection with which we are glad to see that B. Cooke's list of sixty-four species, printed in 'The Naturalist' for 1882, has proved exceedingly useful. There is also a list of 'Additions to a Preliminary Catalogue of the Hemipetera [sic] Heteroptera ' of the same area, published in 1907. This includes four species. There is a photograph of Mr. B. H. Crabtree as frontispiece, but we can find no reference to it in the text.

---

* In fairness to the Hon. Secretary, we should state that he informs us fresh arrangements are to be made next year.—Ed.

A Tourist's Flora of the West of Ireland, by **R. Lloyd Praeger.** Dublin: Hodges, Figgis & Co. pp. XII. and 243. With 5 coloured maps, 27 plates and 17 figures in the text. 3/6 net. 1909.

The author tells us that this book is intended to serve as a 'first aid' to the tourist who desires information, in a condensed form, respecting the peculiar flora which to the botanical student renders the West of Ireland one of the most interesting regions in Europe. We know of no one better qualified than Mr. Praeger for the task, and a glance at the three sections into which the book is divided shows how admirably adapted it is to the end in view. The introductory chapters deal with the physical features, vegetational sub-divisions, plant-formations and natural groups, character of the flora, and progress of botanical investigation. Though brief, the many fascinating points in plant distribution are well brought out. The topographical section describes the more interesting features in the flora of over one hundred areas, and are accompanied by many references to local floras, and more detailed works where more complete accounts may be found. This is followed by the systematic section, giving the distribution of each species, the nomenclature followed being that of the 'Cybele Hibernica' and 'Irish Topographical Botany.' The three sections are separately indexed, the indices being easily found by means of coloured title pages preceding sections 2 and 3. The book is beautifully illustrated by the well-known photographs of Mr. R. Welsh, also by five coloured maps, and many small but clear maps in black and white, showing the distribution of the more interesting species. All intelligent tourists, as well as botanists, will welcome this excellent work, and we should like to see the floras of England, Wales and Scotland treated in a similar way.

Trees: A Hand-book of Forest-botany for the Woodlands and the Laboratory, by the late **H. Marshall Ward, Sc.D., F.R.S.** Vol. V., Form and Habit. pp. X. and 308, with 209 illustrations. Cambridge University Press, 1909. 4/6 net.

This volume, as in its predecessor, is edited by Dr. Percy Groom, and is a very welcome addition to the series. The first part of the book, including nine chapters, deals with the habit of trees, their stems and branches and branching, also the form, bark and non-typical shoots. The chapter dealing with the development of form will be found particularly interesting to students, and the excellent diagrams help materially to elucidate the text. The chapters on non-typical shoots and climbing plants are equally useful, though the author might possibly have revised a detail here and there had he been spared to see it through the press. The special part deals with the classification of trees according to their shapes, and also with shrubs and bushes. The volume concludes with a classification of trees and shrubs according to their seedlings, which, though not so complete as the author intended to make it, yet will be found most useful, while the drawings of the seedlings are all that could be desired.

◆

NORTHERN NEWS.

Last month we recorded that Scotter Common, Lincs., has been fired. Since then we regret to find that another fine piece of Lincolnshire Common, Crowle Moor, has been destroyed in the same way.

We have received from Dr. W. J. Fordham, of Bubwith, Selby, a photograph of an Ash branch (*Fraxinus excelsior*), showing an interesting example of fasciation. As he points out, fasciation has been of very common occurrence this year. Amongst others noted are flowering stems of *Hypochœris radicata*, Daisy, Dandelion and other Composites, *Scabiosa columbaria*, *Plantago lanceolata* and *Ranunculus repens*.

Mr. H. H. Corbett has been appointed Curator of the recently formed Municipal Museum at **Doncaster,** at a salary of £50 per annum.

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THE CAMBRIDGE NATURAL HISTORY.

We should like to congratulate Dr. Harmer and Mr. A. E Shipley upon the completion of their monumental work, 'The Cambridge Natural History,' after sixteen years of labour. In all, ten volumes have appeared; the last, though the fourth in proper order, having been delayed by the untimely death of Prof. Weldon. The work has been so carefully planned, and so excellently executed, that it will for many years hold its place as the leading scientific 'Natural History.'

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Under the above title Messrs. MacMillan have issued the last of the Cambridge volumes. It has been most carefully compiled, and obviously each of the different sections with which it deals has been in the hands of an expert. The illustrations are also numerous and carefully selected. The section devoted to Crustacea has been written by Geoffrey Smith and the late W. F. R. Weldon. Mr. Henry Woods is responsible for 'Trilobites,' and 'Eurypterida'; Mr. Cecil Warburton for 'Scorpions, Spiders, Mites, Ticks, etc.'; Prof. D'Arcy W. Thompson for the Pycnogonida, and Mr. A. E. Shipley for the Pentastomida, the Tardigrada, and for the Introduction to Arachnida and King Crabs.

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With the above heading we are treated to a pamphlet almost mediæval in its simplicity. It has been written by Col. A. T. Fraser (late R.E.), who has been to Java and seen stratified volcanic material there. This has given him an idea. Why should not coal, marble, and goodness knows what else have been thrown up from a volcano? He says 'that coal should be shewn to be an old volcanic product is of the utmost importance, because it must lead, in spite of opposition only to be expected, to finding that many whole series of strata the world over are after all due to seismic forces, rather than slow aqueous deposition, *thus simplifying the science of geology*. When rocks are seen of which it is difficult to assign the age, having a nondescript character, it would be safe to set them down, at least provisionally, as volcanic.'

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We then learn (p. 13), that 'One cannot visit the Italian marble quarries of Carrara without receiving the impression that the marble beds were ejected, accompanied by high-pressure steam, from a fissure, and showered down ; and it is the same with the marble of Mount Parnassus in Greece. The geological peculiarities of Java will therefore well repay careful examination ; and identification of its volcanically-laid strata seems capable of becoming a turning point in geological theory,' etc., etc. This pamphlet has a moral : Keep away from Java !

BETWEEN PATRINGTON AND EASINGTON : AUGUST.

A white road, stretching far, with margins green
    Of cool, soft grass, and hedges thin and low,
    But bright with undergrowth, and the soft glow
Of sunfloods pure, enriching the fair scene.
A wealth of Bramble-blossom, and the sheen
    Of frail and painted wings, where light winds blow
    From the wide Humber's tranquil summer-flow
O'er harvest fields, where patient sowers glean.
A grace of wild flowers peeping here and there,
    From the low grass and herbage of the way,
    Where Nature maketh seeming holiday
With bloom and butterfly and leafage fair,
    But where sweet Purpose, from her dalliance gay
Shall seeming loss with teeming wealth repair.

EDWARD LAMPLOUGH.

GLACIAL AND POST-GLACIAL FEATURES.

In the 'Geographical Journal' for July Mr. G.W. Lamplugh, F.R.S., writes 'Physiographical Notes No. 1,' in which he contrasts the fresh-looking features of the mounds of glaciated areas with the adjacent valleys where obviously considerable erosion has taken place since the Glacial Period. He cites 'the morainic mounds of the Vale of York and of Flamborough Head, and the moundy sands and gravels of Holderness, in their anomalous relation to the huge post-glacial deposits of the Humber and of the Vale of York, and to the erosion-features generally observable where post-glacial streams have traversed drift-covered country. The phenomena of deeply incised post-glacial valleys associated with glacial features only slightly modified, are, indeed, so common in the north of England that it is needless further to particularise their occurrence.' The explanation given is that the mounds were protected by the snows, whilst the floods formed as the results of thaws quickly cut the valleys and spread fans of gravel on the low ground.

COAST CHANGES IN YORKSHIRE.

The Research Department of the Royal Geographical Society is issuing a series of Memoirs on ' Changes on the East Coast Region of England during the Historical Period.' The first of these, dealing with coast changes in East Yorkshire and in the Humber Estuary, by Mr. T. Sheppard, has just been published by the Society in the form of a ' Preliminary Summary Report.' This is divided into sections under the heads of Geological Notes, Lake Dwellings, Historical Evidence, Lost Towns of the Coast, Erosion of the Holderness Coast, Spurn, Hedon, Hull, Lost Towns of the Humber, Ravenser, Erosion in the Humber, New Land in the Estuary, and Thorne Moor and Hatfield Chase.

◆

Thoughts on Natural Philosophy and the Origin of Life, written and published by **A. Biddlecombe.** 5th edition. Newcastle-on-Tyne. 39 pp., 1/-.

With this pamphlet the author has kindly sent us a circular, upon which two paragraphs are marked as ' interesting and conclusive.' We think it best to give them as far more likely to draw our readers' attention to the nature of the pamphlet than are any words of our own :—

' One objection that might be made to the compulsory adjacency and collision of the portions of matter is that, if matter had been projected from points along a straight line at sufficient speed, it would have continued so to progress infinitely, without adjacency and collision ; and this no doubt is true. But it is only necessary to state the objection for it to be eliminated from the discussion. Matter has now adjacency and collision, therefore as it could not have had it under the supposed conditions of the objection, it is certain that matter has never taken (either originally or at any time) wholly that mode of progression.

' The only other line is the curve, and around any imaginary figure we can draw an imaginary curve, or circle ; and for our purpose the curve or curves must permit, if necessary, of infinite extension from the centre to the circumference. It is therefore clear that the portions of matter must have moved (either originally or always) through points in an imaginary circle or circles. The necessity does not exist to bore the reader with long mathematical calculations, the thing is so simple that the calculations and drawings can be made at will. But it is clear that as the portions of matter moved through points in the circle, they must eventually have had adjacency and collision ; and as a result spin, and vertical movement and force, followed by gravitation, electricity and magnetism, together with all the natural phenomena with which we are acquainted, including the sensations of heat and light, as the result of material motion.'

FURTHER PROOFS OF THE FLOW OF THE TRENT ON THE KEUPER ESCARPMENT AT GAINSBOROUGH.

F. M. BURTON, F.L.S., F.G.S.

THAT a river once flowed on the top of the Gainsborough escarpment, which could, to all appearance, have been none other than the Trent, I have shown in 'The Shaping of Lindsey by the Trent.'* Since the publication of this work I have met with further proofs bearing out and confirming this view.

To make the matter clear it will be well to recall the position and status of the Trent at the time it ran in this old course.

The mean level of the Trent near Gainsborough is about twenty feet above O.D. The Keuper escarpment on the east of the town is eighty feet higher than the river, or about one hundred feet above O.D. When the escarpment was considerably higher than it is at the present time, a subsequent stream of the Humber captured the Trent somewhere about, but considerably higher than the region of Newark, and turned that river from the 'Lincoln Gap,' through which it formerly flowed, into its present course.

At the time of the capture the Trent valley had no existence, but it was carved out at a later period by the Trent, as that river gradually cut through the soft yielding marls of the Keuper on the west, thus leaving the hard Upper Keuper rocks standing out, and forming the present-day escarpment, which runs, with some few breaks in its continuity, from Hardwick Hill on the north, to Newton Cliff, and beyond, on the south.

The land on the summit of the escarpment at Gainsborough rises a little as we proceed eastwards, and attains a height of one hundred and twelve feet above O.D., after which it slopes gradually away to the Lower Lias clays beyond ; and on this slope, in a field which has recently been drained, I met with distinct traces of a river bed, exactly like the one I have before described, agreeing with it in all respects, both as to its level and its contents—quartz, quartzites and sandstones—all of which are smoothed and rounded by river action, and imbedded in a matrix of yellowish clay.

The river in this locality probably ran, at the time, in two channels, separated from each other by about seven hundred yards—one on the present brink of the escarpment, and the other on the east side of the twelve feet elevation—and if so, they may very likely have met again, about a mile away on the south, near Warren Wood, where the land is of a sandy nature, and where I have, on occasions, seen the hedgerows nearly buried with blown sand. The higher land in the midst would thus stand out as an island, possibly drowned at times, when great floods prevailed.

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* See 'The Naturalist,' 1907, p. 261.

Another confirming proof of the existence of the old Trent bed, connected with the formation of its valley, has lately come to my knowledge. I had often thought it probable that some relics of river-action might be met with on the side of the escarpment at Gainsborough, in the shape of water-worn blocks and fragments of the hard sandstone layers, which occur in this region of the Keuper—though, from the steepness of the slope and the nature of the rock, such traces could only be few—and I have had, recently, the good fortune to meet with some of them. The town cemetery lies at the top of the escarpment, and, in digging a grave lately, some pieces of the sandstone, broken up and rounded, evidently by water action, have been thrown out.

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ANCHOMENUS VERSUTUS GYLL, A BEETLE NEW TO THE NORTH OF ENGLAND.

J. W. CARTER,
Bradford.

On July 8th, 1909, during a ramble about Ryehill reservoir, near Wakefield, in company with Mr. Bayford, of Barnsley, I had the pleasure of taking a single specimen of *Anchomenus versutus* Gyll—a species evidently new to the north of England. At first I regarded it as a very dark form of the common *A. parumpunctatus* F., but on a critical examination, I came to the conclusion that it was *A. versutus*, and in this Mr. W. Holland, of the University Museum, Oxford, who kindly examined the specimen, agrees; and writes, '*A. versutus* certainly, and a nice one at that.'

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We notice some Lancashire geologists have been 'working the Lias Chalk.'

In a recent Lancashire angling match 'all fish may be weighed in but Jacksharps and Horse Mussels.'

Mr. C. Crossland, F.L.S., has just issued, for private circulation, a second reprint of his 'Fungus Flora of the Parish of Halifax,' in which the additional records since 1894 have been included.

HYBRID BETWEEN *ORCHIS MACULATA* AND *HABENARIA CONOPSEA* IN YORKSHIRE.

W. B. ALEXANDER,
York.

On July 22nd I was gathering some spikes of *Habenaria conopsea* when I noticed one which, in some respects, resembled *Orchis maculata.* Both species were growing in considerable numbers in a small piece of wet ground near the head of Thornton Dale, about six miles from Pickering, where the novelty was obtained. On closer examination I find that it is intermediate in almost every respect :—

(1) The specimen has the scent of *conopsea.*

(2) The spike is more compact than in that species, but less than is usual in *maculata.*

(3) The colour is rosy pink, brighter than that of *conopsea,* about the colour of the darkest type of *maculata.* There are darker red markings on the lip, like those of *maculata,* but not so distinct as usual in that species.

(4) The shape of the flower is decidedly intermediate between the two species, and it is slightly larger than *conopsea* in size. The lip is more divided than in *conopsea* ; the wings are broader, and turn more upwards than in that species, but less than in *maculata.* The spur is almost as broad as in *maculata,* but is nearly as long as in *conopsea,* and has a similar curve.

(5) The rostellum is like that of *conopsea,* and does not project as in *maculata.* But the pollinia are like those of *maculata,* and have not the strap-shaped discs of *conopsea.* The pollinia are small and yellow compared with those of either of the supposed parent species, this defect being what might be expected in a hybrid.

On the other hand, the lower ovaries have already increased considerably in size, looking as if they were going to seed properly.

This hybrid is recorded as British in the last edition of the 'London Catalogue.' It was found in 1898 by Mr. H. Pierson near Sevenoaks (see 'Journal of Botany,' 1899, p. 360), and on the Continent has been named by Camus *Orchis Legrandiana* and *Gymnadania Legrandiana.*—J. G. Baker.

WYCH-ELM SEEDLINGS.

W. P. WINTER,
Shipley.

THIS season has been remarkable for the prevalence of the seedlings of the Wych-Elm (*Ulmus montana* With.). It may, perhaps, be well to place this on record with a note as to some characteristic features of the young plants. The two cotyledons are stalked, fleshy, obovate in outline, with distinct auricles at the base directed downwards. The two pairs of leaves above the cotyledons form with them three decussate pairs, and in this respect the seedlings differ from the description by Tubeuf as translated in Lubbock's 'Seedlings,' where the first leaves are described as alternate. These first two pairs of leaves are shortly stalked, coarsely serrate, with only occasional signs of biserration. They are only slightly asymmetrical, have small stipules at their bases, and both surfaces are rough with hairs, many of which are glandular. Above these leaves the stem becomes more hairy and carries one or two or, more rarely, three small scale-like leaves above the gap between those previously described. Arranged alternately with these is again a similar small set (one, or rarely two). Succeeding to these are leaves in the ordinary leaf-spiral, but not quite so asymmetrical as usual, with stipules of the usual size.

The scale-like leaves certainly suggest modified stipules, and the usual passage from the opposite arrangement of the cotyledons and the two first pairs to the alternate (½ divergence) and afterwards to spiral phyllotaxy is noteworthy.

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The Discovery and Settlement of Port Mackay, Queensland, by **H. Ling Roth,** Halifax: F. King & Sons. 114 pp.

Mr. Ling Roth is well known to the scientific world for his ethnological researches; and consequently any work from his pen will receive serious attention. In the present case we think he has acted very wisely in placing upon record much valuable information relating to the early history of Port Mackay—information which will be of much greater value each year as time goes on. The author was in Queensland some thirty years ago, and took careful note of the district and its numerous attractions. Since then he has kept a keen watch, recording such items as he thought desirable. The first part of the book contains narratives from the books of early visitors to Queensland, including those of Jukes, the geologist. There is a full account of Capt. Mackay's expedition, and of the settlement of the town and district of Mackay. The closing chapters deal with the ethnology and natural history of the area; the Hymenoptera Aculeata being exceptionally well dealt with. There are nearly one hundred illustrations, including maps and charts.

THE CROSSBILL MIGRATION.

On the morning of July 18th an adult female Crossbill was picked up dead under the telegraph wires in King's Road, Ilkley, by my neighbour, Mr. George Priestman, who gave it me to skin. The right wing was broken, and the neck slightly bruised, presumably where it had struck the wire; otherwise the bird was in excellent condition, the body being plump and the plumage very good.—HERBERT WALKER, Ilkley.

Mr. E. C. Houltby, one of our local taxidermists, tells me that when crossing to Hamburg on the 'City of Leeds,' eighty-three miles off Spurn, at 6-5 a.m., August 1st, he saw a young Crossbill come aboard. It seemed fairly tame, and began to eat crumbs. It remained on board until about eleven o'clock.—C. S. CARTER, Louth.

A number of Crossbills came on board a ship off Scarborough the end of June, and seven or eight were caught, and were brought into the Forth. They were seen by my son.—Rev. R. STEAVENSON, Wroxeter.

Small parties of Crossbills were seen near Harrogate in the middle of July. There has evidently been two extensive and distinct immigrations of Crossbills to the British Isles, one at the end of June, and another about the middle of July. As an instance of the great extent of the immigration it is worthy of notice that records were sent from the Orkneys and the Lizard on the same date, and from almost every county on the East Coast, in addition to many visiting ships on the North Sea.

The earlier immigration is noticeable, especially when the fact that Dr. Steward when in Finland in June last, saw parties of Crossbills making their way northward, is considered. In addition to the above records and those which appeared in the August 'Naturalist,' Mr. Boyes in 'The Field,' records a party of a score or so at Beverley, and Mr. Wade, in 'British Birds,' records them at Dalton and Beverley. Mr. St. Quintin told me that they had been seen at Scampston, where they had littered the ground with the green cones of the larch.

Messrs. Boyes and Wade remark upon a fact which is very noticeable, and which has been put on record by many other observers, viz., that the birds had been feeding extensively on Green Fly. There must be many other occurrences in Yorkshire, and observers would do well to forward a record of them to 'The Naturalist.'—R. FORTUNE.

YORKSHIRE NATURALISTS AT SEDBERGH.

August Bank-holiday week-end was one of those rare occasions upon which the members of the Yorkshire Naturalists' Union were not favoured with fair weather. With hardly a break the rain fell continuously; and even the hospitality of the White Hart Hotel hardly seemed to atone for the daily walks through the dripping vegetation, the wades through the swollen streams, and the tramps across the bleak fells. The illness of the local secretary, Mr. W. Robinson, was also a serious drawback; but with the guidance of Messrs. Cosmo Johns, E. Hawkesworth and W. Ingham, the counsel of Mr. John Handley, and the exceedingly valuable local help given by Mr. J. M. Iveson, a profitable week-end was spent.

And in the evenings, after dinner, the members got dried, and compared notes. Good discussions also arose as a result of papers by Mr. R. H. Philip on 'The Diatoms of Sedbergh,' and Mr. Cosmo Johns on 'the Nature of the Interior of the Earth.' Another took place in reference to botanical and geological nomenclature.

On the excursions the geologists first proceeded to the Cautley Valley, where the rocks, though greatly faulted and folded, are fairly well exposed, and are accompanied by much volcanic and igneous material. Exposures of lavas and beds of ashes, apparently contemporaneous with the deposition of the Bala limestone, were visited, as was also the splendid section about a mile away, described by Professor McKenny Hughes as the most complete section in the lower beds of the Silurian and the upper beds of the Bala series. Some time was devoted to an examination of the two dissimilar conglomerates at the base of the Carboniferous rocks, as they are rarely found, as here, in near juxtaposition.

Another day was devoted to Douker Gill and Nor Gill. The former exhibits the results of the Dent Fault, and in one place the Coniston Flags abut against the Carboniferous limestone, and almost throughout the whole course of the stream the rocks show the crushing effects of the Fault. In Nor Gill a very interesting section is exposed, showing a great mass of red conglomerate, as to the exact age of which there is some dispute. It has generally been looked upon as the basement bed of the Carboniferous system in England, and in Scotland as of Upper Old Red Sandstone Age. There certainly is a conglomerate at the base of the Carboniferous rocks in the Sedbergh district, but it varies in several respects from the red one mentioned, and in Nor Gill the relationship of the two is clearly seen. There is no gradual passage from the red deposits to the overlying rocks, and they seem to terminate abruptly, and are succeeded by alternations of grey, or greenish, conglomerate, pebbly limestones, and calcareous shales, the derived material getting gradually less in quantity as a way is made up into the beds of Carboniferous limestone, which here is tilted at a very high angle by the proximity of the Dent Fault.

On the third day the party visited Spen Gill, which exhibits probably the most complete section known of the upper beds of the Bala series and the lower Silurians. Owing to the extremely wet conditions prevailing it was difficult to trace out all the beds, but a good idea of the section was obtained, and numbers of characteristic fossils found. The volcanic rocks of Wandale and Odd Gill were also visited, as was Helm Gill in the Dent Valley, all with satisfactory results.

A section worthy of mention was examined near the Golf Club House. It consisted of a large surface of limestone, grooved and striated, precisely as if by glacial action. Some of the grooves were quite deep. Immediately upon them, however, rested another bed of limestone, under which the striæ extended. It was apparent that the polished and grooved surface was caused by land-slips, the direction of the grooves being down-hill.

The botanists found a rich field, and were well pleased with the abundance of rare and beautiful forms. They investigated Cautley Spout, Howgill, Marthwaite and Killington. For this section Mr. Ingham writes :—

In addition to the FLOWERING PLANTS seen owing to the information kindly given by Mr. John Handley, there are two worthy of notice that came under my own observation.

Thalictrum montanum Wallr. is a small and distinct Meadow Rue growing on the rocks well up Cautley Spout. This species is given as growing on Dalton Crag in the 'Flora of West Lancashire.'

Euphrasia Rostkoviana Hayne was abundant on the banks of the River Lune. It was a striking Eye-bright with its large size and large flowers. I sent a specimen to Mr. Wheldon, of Liverpool, and he at once named it *E. Rostkoviana,* and gave the following characteristics (1) Corolla lengthens after flowering ;

(2) very large flowers ; (3) tall stem, branched below (4) stem and leaves clothed with a mixture of white bristles and long glandular wavy hairs. In 'The Naturalist,' July 1909, I recorded this same Eyebright from near Warthill Station, five miles from York.

MOSSES. The programme for the excursion gave a good list of mosses found in the Sedbergh district, and in the following notes I propose, with one or two exceptions, to mention additions to those mentioned in the circular.

The most interesting moss found was *Campylopus atrovirens* var. *gracilis* Dixon. growing almost buried in mud by the side of one of the waterfalls in the upper part of Cautley Spout. It was first described as a new variety by Mr. Dixon in the 'Journal of Botany,' 1902, page 374. Its distribution is Merioneth, Carnarvon, Cumberland (Lake District), Forfar, and North Ebudes (Skye), etc. Its occurrence at Cautley Spout makes an addition to the Yorkshire Moss Flora. It is quite distinct from the type in being green above, and brown below ; the type being black below, and in its very long and very narrow leaves with its very narrow, long, toothed, hyaline leaf points. This moss is additional evidence of the Lake District character of the Flora of Cautley Spout. The moss *Breutelia arcuata* grows in the same site.

Rhabdoweisia denticulata, specimens of which I have lately received from Mr. C. A. Cheetham and Mr. Albert Wilson from Cautley Spout, I was pleased to locate on the face of vertical rocks near one of the upper falls. The beautiful *Plagiobryum Zierii* was growing close by, and *Grimmia apocarpa* var. *gracilis*.

The three *Andreaeas* mentioned by Mr. Cheetham in the circular were all found on the same rock, and *A. alpina* in fruit. The *A. petrophila* is the var. *flaccida* (teste H. N. Dixon).

Zygodon Mougeotii was plentiful at the Spout. *Rhacomitrium fasciculare, R. heterostichum* (a broad-leaved form), *Ptychomitrium polyphyllum*, and *Plagiothecium denticulatum* var. *majus* were other mosses there.

On the side of the Spout and near the three *Lycopodiums* was *Campylopus flexuosus*. *Sphagnum papillosum* var. *confertum* in huge bosses was the only Peat Moss seen there. A large form of *Brachythecium plumosum* with very long leaf points grows on the rocks near the water.

HEPATICS of Cautley Spout.

Preissia commutata in fruit was on the rock ledges.

Radula complanata, *Blepharostoma trichophylla*, *Lejeunea cavifolia*, and *Frullania Tamarisci* occurred only sparingly, and mixed with mosses. *Metzgeria conjugata* was found in a large pure patch.

On the moor near Helm Gill were two forms of the Peat Moss, *Sphagnum acutifolium*. In the Gill itself, descended only at one spot for mosses, the most interesting species was *Trichostomum crispulum*. The other records at this spot were *Dichodontium pellucidum*, *Eurhynchium rusciforme*, *E. striatum*, *Hypnum falcatum*, and *Plagiothecium denticulatum*.

Barbula rigidula is abundant on the walls by the roadside from Sedbergh to Dent.

The Hepatic *Metzgeria pubescens* was in Flinter's Gill. There were many mosses in this Gill, but during the short visit only the common species were seen.

At the foot of trees on the bank of the River Lune opposite Ingmire Hall, the rare moss *Pterogonium gracile* grows in large tufts.

Sedbergh is a paradise for birds, but the time of year was unfavourable, most of the songsters being silent. Amongst the rare birds nesting in the vicinity are the peregrine falcon, sparrow and kestrel hawks, merlin, buzzard, long-eared, barn, and tawny owls, and occasionally also the short-eared owl. Curlews and golden plovers were found to be abundant on the moors.

At the general meeting held on Monday evening, Mr. Robinson was fortunately well enough to preside. Reports of the work accomplished were given by Messrs. Hartshorn, Ingham, Bairstow, Hawkesworth and Johns. Votes of thanks were passed to the landowners, and also to Messrs. Robinson, Handley and Iveson, for their great help in connection with the excursion.

T. S.

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The Young Naturalist, by **W. Percival Westell.** Methuen & Co. 480 pp. 6/-
Uncle Westell has shuffled his cards, added a pack or two, plenty of new 'pictures,' and gone 'nap.' Anyway, 'The Young Naturalist,' which seems to incorporate most of what he has previously written in other volumes, with the addition of numerous really good photographs, and some coloured plates, is the best thing he has done yet, and will doubtless have a large sale. It is certainly a remarkably cheap book, and will be useful to a beginner as it covers almost every branch of natural history. Though there is a slight improvement in this direction, there is still one person Mr. Westell cannot forget in his writings, and that person is Mr. Percival W. Westell.

A NEW VARIETY OF SEDGE.

P. FOX LEE,
Dewsbury.

ADDITIONALLY to my discovery this year of the Hairy Sedge in its remarkable prickle-glumed form, *spinosa* Mort., by the canal side at Mirfield; in the early part of July this year I happened to be in the sloping pastures on the eastern bank of the beck of the pretty little valley, couched—a boat-shaped depression—in the bleaker higher land to the south of Woodkirk Church. This is known as the Heybeck.*

It is within three miles of Dewsbury, and yet it is a beauty spot retaining some of its original ruralness; and it was, indeed, one of the happy hunting-grounds of a former generation of working-men naturalists, who used to visit it for its gay tassels of Dyer's Greenweed, the golden peasebloom sprays of which give the prominent colour note—yellow, with rose-purple of Betony,—to the dryer turf-clothed spoil heaps of pit 'trials' now long ago forgotten.

These, however, make the pastures hereabouts vary vastly in character. In one place a spring of chalybeate water oozing through the soil on the brow will make a quag in which many water-loving plants congregate; though where the seeds come from it is hard to say, and almost as miraculous is it to suppose they have been there in the soil, awaiting a birth-moment for thousands of years; whilst in another, not a hundred yards away, xerophiles such as the pill-headed *Carex* will occur in plenty. As Dr. Lees says, 'the moral for the field-worker is that *all* require searching, missing none, if the full tale, and the secret of "Associations" is to be told.'

Here, then, it was that comparing the constituents of field after field, I came across, in one quite open moss-swampy strip of sloping ground, grazed over, a few clumps of an unusual graceful-looking hair-pedicelled *Carex*, with recurving bright green leaves, and curving pensile spikelets, aggregated from the upper sheath, which was quite new to me, although, of course, its kinship to the wood-lover *sylvatica* was apparent. Clearly on the track of 'a good thing,' for the unknown has ever an attraction for the botanist, I had hopes the plant might turn out to be *C. strigosa*—as Dr. Lees tells me, a little-known, much-misnamed species, which is not partial to limestone, and yet the only certain S.W. Yorkshire habitat of which is in shade by the stream at Heptonstall Eaves, where it runs over calcareous Yoredale shale.

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* Hey—a corruption of Anglo-Sax *hege*—meaning an enclosure, just as beck means a little stream; and no doubt the name was first given when the glebe was enclosed at some period of the kirk's history.

The individual catkined shoots were nothing like so robust as *C. sylvatica,* and were moreover growing in the open, associated with *Hypericum quadrangulum, Equisetum palustre,* much *Hypnum* moss in matted growth through which grew *Orchis maculata, Juncus acutiflorus, supinus,* and the Sedges *C. leporina, flacca* (glauca), *hirta* and another. The hedgewood about includes Alder, Hazel, Wild Cherry, *Acer campestre, Viburnum Opulus, Salix cinerea* and Sloe, with Dog-rose and *Rosa arvensis.* Some five yards higher up the open wet slope of the pasture, upon my third visit Dr. Lees detected *Lysimachia nemorum*—strong evidence that a wood or thicket, nothing so wet soiled as now (where the collieries and other agents have interfered with natural drainage) once existed, where now cattle are pastured—a district of varied woodland, the very name of which, too, connotes the silvan of some bygone time.

In agreeing to this, Dr. Lees suggests that a fitting name for this extreme, debased (through long interference with normal stresses of growth) form or variety of *Carex sylvatica* Huds., would be *capillariformis,* as in its hair-like spike stalks, in twos or threes from the uppermost sheath it simulates *Carex capillaris.*

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NOTE ON *CAREX SYLVATICA* var. *CAPILLARIFORMIS.*

F. ARNOLD LEES, M.R.C.S.,
Leeds.

Mr. Lee's Hey-beck-dale *Carex,* which I have seen *in situ,* adds another spoke to my wheel or thesis of Change—not fixity, even yet—both in Plant Character as in Distribution. As 'Ichabod'—the glory hath departed!—must be written of many a nook and corner of our land once replete with floral and arboreal Treasure valleys, so such constituents as have survived this denudation, or conversion, under long-acting newer conditions not wholly lethal, change too; and in (at least) their vegetative parts, leaf, flower, stem, etc., adapt their 'characters'—as we call this or that 'feature'—to what best helps their continuing to live. The Hey-beck open marsh *Carex* shews no trace of hybridisation, and in its individual perigynia and the nutlets within is exactly type *C. sylvatica* (Huds.), (elliptic, obscurely veined, with a long cloven smooth beak, and trigonous nut), so that, as with most 'varieties,' the differences which yet make up a strikingly dissimilar facies are in vegetative developments, rather than 'specific' essentials. In proposing for it the style of a *Variety*, its title may not unfitly suggest that *Carex capillaris* L. of Gordale, which the late Prof. Babington placed next to *strigosa* Huds. in his diagnostic arrangement :—*Carex sylvatica* Huds. var. *capillariformis* mihi. ♂ spike one, distinct or part of top catkin ; ♀ spike, curved, brief, 7 to 15-flowered, all (except the uppermost) from short sheaths, on very longly exserted capillary pensile pedicels, three to five times the length of spike. Two or three stalks aggregate and spring from the topmost sheath but one (in some cases, not all). The uppermost female spikelet with only 5-7 perigynia and so looking ovate, springs from the same sheath as the male spikelet. Spikelets and glumes of a bronzy green-brown. Habit, tufted from a brief rhizome, Height, 8-12 inches. Frondage of a full yellow-green, outcurving vase-like from tuft, 2 to 3 millimetres in breadth of rough leaf.

The whole plant has a healthy appearance in its seat, virile, hardy, perfecting its fruits abundantly, evidently quite capable of holding its own in competition with pasture grass ; but that it is a specialised descendant from a dry woodland slope two hundred, or it may be only a hundred years back, I am convinced ; and supported in that by the panning-out presence of the Woodland Loosestrife (now creeping like *L. nummularia* through the wet matt grass). Its immediate associates now have come, I doubt not, with the perhaps recently broken-out spring in the pasture above, much later than the *Carex silvatica* and *ovalis* and *Lysimachia nemorum.* The grass swamp is a recent one ; I looked in vain for *Triglochin,* that surest sign of an old soil regime passing away.

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Amongst the additions to the **Grosvenor Museum, Chester**, during the last twelve months, we notice local specimens of the Common Crane, Ruff, Gadwal, skull of *Bos primigenius* and Lesser Shrew.

SOME NEW YORKSHIRE BEETLES.

T. STAINFORTH,
Hull.

During the past two years I have paid particular attention to the Coleoptera of the East Riding shore of the Humber. Much of the material collected yet awaits examination, but the following notes on the occurrence of some species new to the Yorkshire list which appears in the Victoria County History, may not be without interest.

Harpalus rotundicollis Fair.

A single male specimen of this species was found on August 29th last year, under drift at the foot of the embankment on the Humber shore near Hull, between Marfleet Creek and Lord's Clough. Careful examination and comparison with specimens from the south of England proved it to be this species, and my identification has been confirmed by Mr. E. G. Bayford, of Barnsley, and Dr. W. Wallace, of Grimsby. As far as the lists at my disposal show, this is the most northerly record for the species, and Fowler states that he has never 'found it in the north, and that it does not appear in the Yorkshire, Durham and Northumberland, Scotch or Irish lists.'

Blechrus maurus Sturm.

This species occurs commonly in the same locality as the preceding, but it makes its habitat under the lumps of chalk on the top of the embankment. They seem to affect the lumps which are embedded in the clay, and on turning such a piece over half-a-dozen specimens have been seen together. They are so active, however, as to be difficult to catch, and if they escape among the crevices between the lumps of rock, capture is well nigh impossible. The species occurs less commonly in a similar situation on Saltend, and I found a single specimen between the grass and the stone capping of a clough on the side of Hedon Haven. The dates of capture were July 28th, August 20th, and October 5th, 1908.

Cœlambus parallelogrammus Ahr.

On September 20th, 1908, this little water beetle swarmed in the brackish pools on the land side of the embankment on the Humber shore, near the new Joint Dock at Marfleet near Hull. The pools had become very low, and were swarming with beetles, chiefly consisting of this species, *Agabus conspersus, Dytiscus marginalis* (some of which were dead or dying), and *Philhydrus maritimus.*

PHALERIA CADAVERINA F.

On May 30th of this year, whilst turning over some drift seaweed on the sand on the Humber side of Spurn at the Kilnsea end, a single specimen of *Phaleria cadaverina* was secured. In the same locality on June 13th, I discovered another specimen, which the wind carried away as I was about to put it into a tube. Further specimens, however, will probably be found if the drift on the Humber side of the point is examined. This and the next species, *Heliopathes gibbus*, are two good additions to Yorkshire Tenebrionidæ.

HELIOPATHES GIBBUS F.

On May 25th, 1908, I obtained two, and on June 13th, 1909, one specimen of *Heliopathes gibbus* at Spurn. The first two were found at the roots of grass tufts on the sandhills, and the last example under the seaweed drift on the Humber side of Spurn.

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NEWS FROM THE MAGAZINES.

A strikingly illustrated article on 'The Evolution of the Flower,' by S. L. Bastin, appears in Cassell's *Nature Book*, part 34, recently issued.

A masterly paper on 'Glacial Erosion in North Wales,' by Prof. W. M. Davis, appears in the August *Quarterly Journal of the Geological Society*.

We are glad to find that the *Lancashire Naturalist* has flattered us by imitating many of the features of *The Naturalist*.

'Afforestation as a National Duty' is the title of an instructive paper by Mr. S. Margerison, in the *Land Agents' Record* for March 20th.

Mr. R. Standen describes some varieties of *Dreissensia polymorpha*, with an excellent plate, in the August *Lancashire Naturalist*.

Prof. Patten has a paper on 'The Ornithology of Skerries, Co. Dublin, in the September *Irish Naturalist*.

In the September *Entomologist's Monthly Magazine* there is an excellent coloured plate upon which are figured *Myrmecoris gracilis*, *Arena octavii*, *Phytosus nigriventris*, *Orochares angustata*, *Stichoglossa semirufa*, *Lomechusa strumosa*, *Læmophlœus monilis*, and *Diastictus vulneratus*.

Mr. Robert Newstead has an interesting paper 'On a recently discovered Section of the Roman Wall at Chester' in Vol. II., No. 2, of the *Annals of Archæology and Anthropology*.

Mr. Richard South writes a note on *Peronea variegana* and aberrations in Durham in the September *Entomologist*.

In the July *Lancashire Naturalist* Mr. W. H. Sutcliffe has an illustrated paper on '*Palæoxyris prendellii* from the well-known Coal Measures at Sparth, Rochdale.'

Mr. S. Duncan noted a Spoonbill on the North Humber shore on Aug. 15th (*British Birds* for September). In the same journal it appears that Kent has again produced a 'new British bird'—nay, new to Europe! This is the Brown Flycatcher, which has 'never before been recorded as occurring west of Chamba, Kashmir.' Whilst it is stated that there are many reasons why this bird is not an 'escape,' we should hesitate to make these frequent additions to the British list on the strength of single specimens.

ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

Rev. C. E. Y. KENDALL, B.A., J. DAVY DEAN, and
W. MUNN RANKIN, M.Sc., B.Sc.

(*Continued from page 319*).

At present it is impossible to determine the exact distribution of this shell. Evidence that it is locally abundant may be seen from examination of various limestone 'pavements' at Silverdale and Hampsfell (Grange). After heavy rains numbers of dead specimens are washed down from the loose sub-soil above, and may be found in the crevices and on the ledges of the rock below the 'pavements.'

2. *Coniston Limestone.*

Pupa cylindracea da Costa. Associated species :—

Agriolimax agrestis L.
Pyramidula rotundata Müller.
Cochlicopa lubrica Müller.

The principal feature connecting this formation with those of the Carboniferous Limestone is the abundant presence of this species. It takes the dominant position on the Coniston Limestone, and is abundant in exposed situations within the 1000 feet zone. The absence of *Pyramidula rupestris* is noteworthy, and the habitual occurrence of *P. rotundata* is important. The association is a non-calcareous one. It is noteworthy that in all its extension across the Lake District no distinctively calcareous plant species, with the possible exception of a few lichens and mosses, may be found on this rock. In Ribblesdale, however, it is somewhat more productive showing a much closer affinity to the Carboniferous Limestone.

Non-Calcareous Pastures.

Heaths (*Calluna* and Grass Heaths). Associations shewing conditions uncongenial to ordinary plant life.

Limax arborum Bouchard-Chanteraux. Associated species :

Agriolimax agrestis L.
Vitrea alliaria Miller.
Pyramidula rotundata Müller.

On the heaths this species would appear to be the dominant one, for though 'the Tree Slug,' it is by no means confined to trees. It occurs in the open at Ambleside, and on the higher parts of Coniston Old Man, reaching an altitude of 2600 feet.

As is usual, apparently, on the more open grounds, the typical form of *L. arborum* is replaced by the darker deeply-banded variety. It is fairly common in the vicinity of moisture, and exhibits the gregarious habit, five or six examples often congregating under one stone. The above species were taken with it at an altitude of about 1000 feet, but occurred only sparingly. *V. alliaria,* a species which seems able to adapt itself to almost any conditions, finds refuge in dry weather under stones in boggy places.

MARSH LANDS OR WET GRASSLANDS.

§ 1. CALCAREOUS LAKES AND PONDS (Hard-water).

OPEN WATER.	REED BELT.	MARSH.
Limnæa pereger Müll.	*Physa fontinalis* L.	*L. truncatula* Müll.
Planorbis albus L.	*Limnæa palustris* Müll.	*Aplecta hypnorum* L.
Valvata piscinalis Müll.	*Planorbis contortus* L.	*Pisid. pusillum* Gmel.
	,, *fontanus* Lightfoot.	,, *obtusale* Pf.
	Bithynia tentaculata L.	*Carychium minimum* M.
	Valvata cristata Müll.	*Vertigo pygmæa* Drap.
	Pisidium nitidum Jen.	*Punctum pygmæum* Drap.
	,, *milium* Held.	*C. lubrica* Müll.
		Vitrea radiatulata Ald.
		,, *crystallina* Müll.
		Euc. fulvus Müll.

Between Reed Belt and Marsh. Schœnus Belt. (*Schœnus nigricans* L.).

Succinea elegans, var. *ochracea* Betta. Associated with *Limnæa truncatula* Müll.

The above are the molluscan fauna associations of a typical calcareous lake. *Neritina fluviatilis* and *Ancylus fluviatilis* are absent, being typical denizens of the non-calcareous rivers.

The former existence of large expanses of water in the district is shewn by the extensive development of lacustrine marls at Burton and Silverdale. The contents of the marls strongly confirm the present associations of the calcareous lakes, and throw some interesting light on former conditions of aquatic life.

HAWES WATER at Silverdale, with its beach of exposed chara-marl, is still the largest sheet of water in the calcareous region. The species of the open water are not numerous. The present *Limnæa pereger* are of the usual lacustrine type, but those in the marl fall into two groups, one lacustrine and the other a form similar to that common to calcareous streams at the present time. *Physa fontinalis* is absent in the marl, being a species of later date. Of those in the reed-belt *L. palustris* is recent and does not occur in the marl; *Bithynia tentaculata* is abundant, living and in the fossil state; *Planorbis contortus* sparingly fossil and recent.

The following shows the probable grouping of the marl species.

Open Water	Reed Belt.	Marsh.
L. pereger Müll.	*B. tentaculata* L.	*Pisidium pusillium* Gmelin
Planorbis albus L.	*Planorbis fontanus* Lightfoot.	
,, *crista* L.	,, *contortus* L.	,, *obtusale* Pf.
Valvata piscinalis Müll.	*Valvata cristata* Müll.	
	Sphærium corneum L.	
	Pisidium nitidum Jen.	
	,, *milium* Held.	

There are evidently no river deposits as *Ancylus fluviatilis* and *Neritina fluviatilis* are absent, and the conditions of life when the deposits were laid down would seem to be similar to those obtaining to-day, viz., a deep lake fed by springs, with a shelving shore fringed with reed beds.

Hale Moss is a small patch of a few acres, mostly white with marl and litter, covered by shallow peat, occupying what was the deepest (30 feet) hollow of the ancient Burton Lake. The proportion of shells in the marl here is very much less than in that at Hawes Water. The following species occur in the marl, and may be grouped thus:—

Open Water.	Reed Belt.	Marsh.
L. pereger Müll.	*Valvata cristata* Müll.	*L. truncatula* Müll.
Valvata piscinalis Müll.	*Pisidium nitidum* Jen.	*Pisid. pusillum* Gmelin
	,, *cinereum* Alder.	,, *obtusale* Pf.

The noticeable fact here is the absence of the Planorbis group and shallow water species—pointing to the existence of a well-filled lake of great dimensions, which has now entirely disappeared.

In the marl deposit, *L. pereger* far exceeds in number all the other species. The shells are not lacustrine in form, but are very similar to those of the Irish marls. In regard to this deposit, Mr. A. S. Kennard says: 'Judging from your list, the deposit is not a shallow water one, and was laid down in two to three fathoms' . . . . '*Planorbis* is a shallow water form, and not likely to occur in a deep water deposit.' . . . . . '*Bithynia tentaculata* is rather a shallow water form, whilst the hall-mark of shallow water is *Limnæa stagnalis* and *Limnæa palustris*.'

As will be seen, *Planorbis* and *Bithynia* are absent, only deep water species being found.

On the present moss occurs—*Succinea elegans* var. *ochracea* Betta., associated sparingly with—

Vitrea crystallina Müll.
Limnaea truncatula Müll.

The surface of Hale Moss, as that part of the old lake is called to-day, which is not under cultivation, is well sprinkled with tufts of the rare plant *Schœnus nigricans* L. Between the tufts the marl lies bare without any peat. In wet weather the Succinea crawl freely on the surface, and in drier weather burrow beneath the marl, or crawl into the roots of the Schœnus. In winter they are to be found in hibernation, securely fixed to the 'rushes' some inches above the base of the stem. This *Succinea* is unlike any other British form. The peculiar extended spire, and the angularity of the last whorl would seem to place it as intermediate between the two species *S. elegans* and *S. oblonga*. It may perhaps be due to xerophilic conditions, marking an advance from an amphibious to a land mollusc.

§ 2. CALCAREOUS RIVERS AND STREAMS.

No good example in the district.

§ 3. NON-CALCAREOUS LAKES AND PONDS (Soft-water).

1. Ponds.

OPEN WATER.	REED BELT.	MARSH.
Limnæa pereger Müll.	*Sphærium corneum* L.	*Limnæa truncatula* Müll. *Planorbis spirorbis* Müll. *Aplecta hypnorum* L. *Pisidium pusillum* Gmelin. *Succinea elegans* Risso.

This association is typical of a non-calcareous pond with very little reed belt, and a marshy tract at one end which becomes in summer a dense mass of high grass and sedges.

2. Very shallow ponds :—

OPEN WATER.	REED BELT.	MARSH.
Sphærium lacustre Müll.	Nil.	Nil.

Such ponds often become practically dry in summer, only moist clay remaining. *Sph. lacustre,* a species with very closely fitting valves, is well adapted for retaining life even under these conditions, and may be found buried in the dry mud.

3. Large Lakes. Example—Lake Windermere.

OPEN WATER.	REED BELT.	MARSH.
Limnæa pereger Müll.	*Physa fontinalis* L.	—
Planorbis albus L.		*Succinea elegans* Risso
Ancylus fluviatilis Müll.		—
		Arion subfuscus Drap.
		Agriolimax lævis Müll.
		Zonitoides nitidus Müll.
		Euconulus fulvus Müll.

Ancylus fluviatilis occurs principally near the outflow, that is in practically fluviatile waters. *Arion subfuscus* is the dominant species on the lake margin. *Z. nitidus* is typically a non-calcareous marsh species, corresponding to the allied species *Z. excavatus* on drier ground.

In this section also comes :—

Anodonta cygnea L., which is characteristic of a non-calcareous lake or pond with a muddy bottom. It is abundant where it does occur, just as in the canal it takes entire possession of the deeper water. No definite association of the habitat can be given ; probably it is solitary. It is worthy of note that the largest known specimens (measuring nine inches in length) have been taken from a pond near Garstang.

Sub-section 3*a*.—SOFT WATER CANALS. (Example—Preston and Kendal Canal).

OPEN WATER.	REED BELT.	MARSH.
Limnæa pereger Müll.	*Acroloxus lacustris* L.	*L. truncatula* Müll.
,, *auricularia* L.	*Limnæa palustris* Müll.	*Pis. pusillum* Gmelin.
Planorbis albus L.	*Planorbis umbilicatus* Müll.	*Succinea putris* L.
Valvata piscinalis Müll.	,, *vortex* L.	,, *elegans* Risso
Anodonta cygnea L.	,, *fontanus* Lightfoot.	*Agriolimax agrestis* L.
Pisidium amnicum Müll.	*Physa fontinalis* Drap.	,, *lævis* Müll.
Sphærium lacustre Müll.	*Bithynia tentaculata* L.	*Arion ater* L.
ON ROCKS	*Valvata cristata* Müll.	,, *hortensis* Fér.
Neritina fluviatilis L.	*Sphærium corneum* L.	*Vitrea crystallina* Müll.
(*Dreissensia polymorpha* Pallas).*	*Pisidium fontinale* Drap.	,, *radiatula* Alder.
	,, *milium* Held.	*Z. nitidus* Müll.
		Euc. fulvus Müll.
		Hygromia granulata Ald.
		,, *hispida* L.
		Cochlicopa lubrica Müll.

As will be seen and as might be expected, the molluscan fauna places the canal intermediate between non-calcareous lakes and non-calcareous rivers. In the open water section there is a striking abundance of both *Anodonta cygnea* and *Neritina fluviatilis*, the former a species prevailing in the deeper non-calcareous ponds, and the latter typical of slow-flowing rivers. *Physa fontinalis*, which comes on the outer margin of the Reed-belt, is very abundant, especially in the late winter and early spring. *Bithynia tentaculata* is perhaps the dominant species following the Physa period, while *Limnæa pereger* and *Limnæa auricularia* encroach locally for a short period about May.

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* An introduced alien.

There is an abundant molluscan fauna on the grassy margin of the canal, but there is, of course, little in the way of a true marsh. *Succinea elegans* is typical of this habitat, and very abundant, and there are thriving colonies of *Hygromia granulat* and *H. hispida* in the patches of *Potentilla anserina*.

§ 4. NON-CALCAREOUS RIVERS AND STREAMS.

(All the Rivers, Streams and Becks in the district come under this heading).

(*a*) THE SMALLER STREAMS (Becks).

OPEN WATER.	REED BELT.	MARSH.
Ancylus fluviatilis Müll.	Nil.	*Pisidium pusillum* Gmelin.
Limnæa pereger Müll.		

The above is characteristic of a swiftly-running beck and the full association is dependent on the gradient. In some of the swiftest reaches of the becks *Ancylus*—the typical mollusc of running water, alone is present, while the *Pisidia* occupy the more muddy shallows of the lower beck.

(*b*) RIVERS (Example—R. Lune).

OPEN WATER.	REED BELT.	MARSH.
Ancylus fluviatilis Müll.	*Physa fontinalis* Drap.	?
Limnæa pereger Müll.	*Pisidium amnicum* Müll.	
,, *auricularia* L.		
Valvata piscinalis Müll.		
Neritina fluviatilis L.		
Unio margaritifer L.		

The species common to both the lower and upper reaches are *Limnæa pereger, Ancylus fluviatilis* and *Neritina fluviatilis*, the latter gradually disappearing towards the source.

(*To be continued*).

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The **Hull** Museum continues to pour out its penny pamphlets. We have recently received No. 59, A 'List of East Yorkshire Spiders, etc.' by T. Stainforth. This includes 177 spiders, 14 phalangidea, and 5 pseudo-scorpions. Nos. 60 and 61 are the usual Quarterly Records, the former containing notes on Hull plans, forgeries, skull of fossil Bison, etc., the other including notes on old Hull ships and shipping, the Brigg pre-historic boat, slavery relics, and mediæval antiquities. A further (third) edition has been issued of the Guide to the Albion Street Museum, Hull, and contains much new matter.

In Memoriam.

THOMAS SOUTHWELL, F.Z.S., M.B.O.U.

(1831-1908).

ALL those interested in natural history, and museum work generally, and particularly those who knew him personally, will regret to learn of the death of Thomas Southwell. He had the kindliest of dispositions, and was a delightful companion either in the study or in the field.

It is only a few weeks ago that he spent several days in Kent with the members of the Museums Association. He had just returned from Norway, where he had been recuperating his health after a severe illness. Though as lively and affable as ever, it was not difficult to tell that his age was beginning to shew itself ; though few then thought he would leave them so soon.

Thomas Southwell was one of the old-fashioned type of naturalist, and was equally at home with the flowers or insects or birds ; though the vertebrates were perhaps his favourites. His writings were always of a useful character ; perhaps his best known work being ' Seals and Whales of the British Seas.' He also edited the third volume of Stevenson's ' Birds of Norfolk,' and a new edition of Lubbock's ' Fauna of Norfolk.' The ' Transactions of the Norfolk and Norwich Naturalists' Society,' and the ' Zoologist,' contain a number of articles from his pen ; the annual reports on the northern seal and whale fishery appearing in the latter journal, being of particular value. He took a great interest in the Norwich Castle Museum, his Guide to which was exceedingly popular.

He was born at Kings Lynn in 1831, and died at Norwich on the 5th September.

T. S.

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Round the Lake Country, by Rev. **H. D. Rawnsley.** Glasgow : J. MacLehose. 1909. 227 pp., 5/-.

Those who know aught of the Lake District, know of Canon Rawnsley. And those who know Canon Rawnsley well, know the Lake District better for it. He has lost no opportunity of drawing attention to the beauties of that charming area, and in the present work he still further advertises the natural history, archæological and poetic attractions of the lakes. The book is in twelve chapters, and deals with the Coast, the Arnside Lily-woods, the Ravenglass Gullery, the Bewcastle and Gosforth Crosses, Gowbarrow Fell, etc. Each is sympathetically written ; the archæological part of the work being perhaps predominant. There are excellent illustrations of famous old crosses, some of the originals of which are surely too valuable to be allowed to remain in the open in all weathers.

FIELD NOTES.

MAMMALS.

Badgers near Harrogate.—Badgers are not uncommon in the district surrounding Harrogate, but it is not until recently that they have approached the confines of the town. One was caught early this year at Plumpton in a rabbit trap, he was very thin, and had apparently found difficulty in obtaining sufficient food. Early in July one was captured alive between Beckwithshaw and Rigton, and another one near Plumpton. These occurrences seem to point to the fact that these interesting animals are penetrating into the Crumple Valley, where they have hitherto been unknown, coming probably out of the Tadcaster district. Some years ago 'earths' in the neighbourhood of Allerton and Ribston were re-occupied after having been untenanted for many years. Lord Mowbray informed me that they suddenly appeared in Allerton Park, occupying old 'earths' where they had been unknown for a great number of years.—R. FORTUNE.

Spotted Otters.—In connection with the note at the foot of page 308, recording the capture of a speckled otter at Lough Sheelin, Ireland, the following curious entry copied from the Hawkstone Catalogue, written by Harry Shaw in 1848, may be of interest :—" In Scotland the vulgar have an opinion that there is a king among the Otters, spotted with white ; that its skin is endowed with great virtue as an antidote against infection, a preservative of the warrior from wounds, and ensures the mariner from all disasters upon the seas. The Viscount Hill possesses one of these curious skins : the Otter from which it was taken was killed in North Wales." The Hawkstone collection was removed to Peplow Hall (Mr. Beville Stanier's) in 1904, since which date I have examined and catalogued the entire series. The skin is not there now, and seems to have perished years ago. Several specimens had to be destroyed, being in bad condition, but the skin was not amongst these.—H. E. FORREST.

Black and Brown Rats.—At the beginning of the present summer, Mr. H. A. Auden kindly sent me several specimens of the old English Black Rat (*Mus rattus*) which had been caught at Widnes, in Lancashire. I kept two of them alive in a home-made cage, and have them yet. On looking into their nest in the middle of August, we found six young ones, about three weeks old, and of these six, four are of the ordinary black type, and two of the brown *alexandrinus* type. Mr. W. J. Clarke, of Scarborough, tells me that he has on several occasions bred these rats, but has only once succeeded in rearing a litter, and he further informs me that all his young ones were of the ordinary black type. I did not know myself until my rats bred that the two forms were produced in the same litter, and from black parents. I thought that each form, the black *M. rattus*, and the brown, *M. alexandrinus* bred true. Probably all these rats found in this country at the present day are imported specimens which have come off ships. Even when obtained inland, I have traced their presence as due to assistance from the coast, by barges, etc., and I very much doubt whether there be left in the kingdom a pair of the old indigenous English Black Rat, which has disappeared before its more powerful grey congener, save in one or two very isolated districts.—OXLEY GRABHAM.

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COLEOPTERA.

***Ptilinus pectinicornis* L. at Barnsley.**—Early in July I discovered specimens of this curious beetle emerging from a willow post in my garden, and had the pleasure of observing the habits of the female as she excavated the tunnel in which to lay her eggs. Having enlarged the exit, she then commenced to make the tunnel by working in an upward direction perpendicular to the further extremity of the exit tunnel, which was at right angles to the face of the tree. As the wood fell down in fine frass, it accumulated immediately below where she was working. At intervals she descended backwards, and in that position pushed the frass with her hindmost feet, towards, and ultimately out of the hole. The males emerged a few days before the females, as seems to be the rule amongst internal feeders. It does not appear to have been noted before that the female as compared with the male, apart from the remarkable differences in the antennæ, is almost perfectly cylindrical, the male being depressed on the upper surface, and broader in proportion to the depth between the upper and under surfaces.—E. G. BAYFORD.

***Gracilia minuta* F. in Yorkshire.**—In addition to the records cited in recent communications to 'The Naturalist,' both Barnsley and Doncaster occur in the list of Yorkshire

Beetles in the Victoria County History of Yorkshire. *Leptidea brevipennis* Muls., admitted to the British list by Messrs. Beare and Donisthorpe, on insufficient grounds, I think, has also occurred at Barnsley.

Although I have several times met with *Gracilia minuta* in a free state, on what one might call neutral ground, I have not yet found it in such circumstances that I should feel justified in claiming it as an indigenous species. It has excellent powers of flight, and in bright sunshine, is very lively, reminding one more of a large gnat than a beetle. The mere fact that it has been found some distance away from business premises, is not of itself sufficient to characterise it as indigenous. The only real proof that it is such, is the finding it in one or other of its stages, preferably an immature specimen, still in the pupal chamber.

Similarly, every year specimens of *Sirex gigas* are brought to me, some of them having been taken in country lanes on the outskirts of the town, but there is not the faintest reason for supposing them indigenous to the district. Timber for pit props is in abundance all over the district, and so are fruiterers' hampers, in which *Gracilia minuta* and *Leptidea brevipennis* are imported into the country.—E. G. Bayford.

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MOLLUSCA.

Colonization of *Helicella virgata* at Hubbard's Hills, Louth.—In my notes on 'Mollusca of Hubbard's Valley' in 'The Naturalist,' February 1904, I recorded that in the Autumn of 1900, I deposited about half-a-dozen living specimens of *Helicella virgata* on the grassy slope at the south end of the hills, in the hope that a colony might be established. This high bank is on the outcrop of the Lower Chalk, and the predominating plants on the area where the molluscs were deposited are rest-harrow, rock-rose and knapweed. Nothing was seen of the molluscs until the 12th of August, 1902, when one example was found. Four years again elapsed without any record of them. On October 3, 1906, I saw four living and two dead; on February 18, 1907, I found three dead shells; on October 17, 1907, three living ones were seen by Mr. V. Howard. On September 3, 1908, I counted twenty-three living specimens, and on September 19, 1909, I counted fifty-three living on an area about twelve feet square. How many more there might be, or how far they had extended their range along the bank, I had not time to ascertain, but was satisfied they had become well established.—C. S. Carter, Louth.

***Arion ater* L. as a Wart Curer.**—The *Arion* or Black Slug has from time immemorial been believed to possess great and wonderful healing properties, and its use in various forms are said to have a beneficial effect upon many ailments.

Until comparatively recent times the Slug held a notable place in Medicine, and formerly occupied a place in the *Materia Medica*.

The marvellous faith and belief in its efficacy as a specific for the removal of warts was formerly widely diffused in our own and other countries, and faith in the potency of the remedy probably still lingers in the more secluded rural districts, while the method of using the slug for this purpose being practically similar in widely distant parts, points to a very ancient and common origin of the belief in its efficacy.

The rubbing of the wart with the body of the Slug, described by Mr. Petty,* has for its basis the belief that the wart and the Slug become thus mutually impregnated with each others nature, so that when the Slug is afterwards securely impaled on a thorn and left to slowly die and waste away, the wart being now, by the mingling of their humours, akin to the dying Slug, is sympathetically affected, and disappears also. It may be added that if the wart does not disappear simultaneously with the desiccation of the body of the Slug, the patient has not placed implicit faith in the remedy, or has failed to observe the necessary secrecy !—Jno. W. Taylor.

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The people of **Maidstone** are to be congratulated upon the excellent museum in their midst, a portion of which is kept in the Chillingham Manor House—a building which is a museum in itself. Mr. Allchin, the Curator, has recently issued an admirable handbook, in which the building and its contents are described and well illustrated (142 pp., 1/-). The collection is particularly rich in geological and archæological treasures, the British, Roman and mediæval relics being unusually representative, as might be expected from so interesting an area as that round Maidstone. The natural history department is also very well described, and includes one of the finest collections of bees in the country ; largely as a result of the efforts of one of the staff. We are glad to see that an improved and enlarged edition of the Guide is promised, and in this the few misprints in the present edition will doubtless be corrected. Amongst these 'Concert,' (p. 119) should be 'Consort ; and 'Woodcrinus' (plate XI.) should be 'Woodocrinus.' Plate XI., by the way, contains an illustration of an excellent slab of crinoid 'heads' from Richmond, Yorkshire.

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* 'Naturalist,' August, p. 303.

REVIEWS AND BOOK NOTICES.

From Messrs. Milner & Co., of Halifax, we have received three volumes of their 'XXth Century Science Series,' which are remarkable alike for their cheapness and the excellence of their contents. Each consists of about 130 pages, is illustrated, and well bound in an attractive red cloth cover. We only hope the volumes will have the circulation they deserve. **Prof. A. C. Haddon** writes on **Races of Man and their Distribution,** the name of the author alone being a guarantee of the excellence and reliability of the matter. This volume forms a summary of the subject such as has been wanted for some time. **Mr. Joseph McCabe,** who is well known for his translations of various foreign works on Evolution, writes on **Evolution: a General Sketch from Nebula to Man,** and deals with the subject in eight chapters, the last being 'A forecast of the end.' **Physiology of the Human Body** is suggested as a text-book for students, and is by that voluminous writer, Dr. Andrew Wilson.

The **Viking Club** continues to issue its valuable publications. Its **Saga Book** (Vol. VI. pt. 1, 161 pp.) just to hand, is of more than usual interest to northern antiquaries. Prof. A. Bugge writes on 'Seafaring and Shipping during the Viking Ages'; some interesting comparisons are drawn between Brunanburh and Vinheið in 'Ingulf's Chronicle and Egil's Saga,' by the Rev. C. W. Whistler; and there are also readable papers on 'The Vikings in Spain,' by J. Stefansson; 'The First Christian Martyr in Russia,' by F. P. Marchant; 'The Sites of three Danish Camps, etc., in East Anglia,' by B. Lowerison;' 'A Ship Burial in Brittany,' by P. Du Chatellier and L. Le Pontois, etc., etc. Several of these are illustrated. Parts 11 to 16 of the Club's **Old Lore Series** have also been published, and deal with Orkney, Shetland, Caithness and Sutherland records. Amongst the many items are several curious records of superstitions, witchcraft, fairies, etc., etc. These publications reflect the greatest credit upon the Editor, who has had a difficult task.

A second edition of **Observing and Forecasting the Weather**: Meteorology without Instruments, by **D. W. Horner,** has been issued by Messrs. Witherby & Co. (48 pp., 6d. net). It is an improvement on the first edition, already noticed in these columns; and the illustrations are better.

The West Riding County Council Vacation Courses is the title of an attractively prepared pamphlet, issued for the benefit of the teachers attending the County Council Course at Scarborough in August. It contains a number of papers, including 'The Queen of Watering Places,' by Dr. J. Irving; 'A Few Remarks on Botanical Excursions,' by Mr. O. V. Darbishire; 'The Teaching of Science and Domestic Subjects to Girls,' by Prof. A. Smithells, and 'Filey: its Brig and Cliffs,' by Mr. T. Sheppard.

Few volumes have appeared in recent years which have shewn such a wide range of reading and research on the part of their writers, as does **Folk Memory** or the Continuity of British Archæology, by **W. Johnson.** (Oxford: the Clarendon Press. 416 pp., 10/6 net). And few volumes can be said to possess such a mass of sound scientific deduction as does 'Folk Memory.' *Evolution* is the author's key-note, and in a fascinating way Mr. Johnson shews how in many directions we have survivals of primitive forms. That he is thoroughly up-to-date with regard to his reading is proved by his numerous references to 'Forty Years' Researches,' by Mr. J. R. Mortimer, and to other works of even more recent date. To find fault with any part of the book is difficult; to enumerate the various subjects dealt with is impossible in the space at our disposal, but we can give our readers an idea of the nature of the subjects dealt with by the following hap-hazard selection:—Evolution of stone and bronze implements, of canoes from the old 'dug-outs,' of Tombstones, crosses, burial mounds, garden implements, roads, etc., etc. There are also chapters on dene-holes, dew-ponds, megaliths, flint-knapping, linchets, incised figures on the chalk downs, fairies, etc., etc. There is a bibliography which is of the greatest service to students, and a very good index. If the book has a drawback at all, it is that once started, it *must* be read from cover to cover, and for this other work must be neglected ! But it's worth it.

Report on the Scientific Results of the Voyage of the S.Y. 'Scotia' during the years 1902-4, under the leadership of Dr. W. S. Bruce, Vol. IV., Zoology, Part I. 'Zoological Log,' by **D. W. Wilton**, J. H. H. Pirie and R. N. R. Brown. Edinburgh : The Scottish Oceanographical Laboratory. 105 pp., plates and maps. 10/6.

This is an elaborately prepared report of a carefully made zoological log kept during the voyage of the 'Scotia.' In the evenings when the party met together, the appointed recorder extracted from the various members the various observations they had made during the day. These were written down on the spot, and too much praise cannot be given to the assiduous way in which the records have been made. In this way mammal, bird, fish, reptile, mollusc and other forms of life are noted and described, and as by far the greater part of the voyage was made in a land little known, amongst animals even more unfamiliar, the scientific value of this log is enormous. This, however, is much increased by the reproduction of over a hundred photographs of antarctic life. The photographs of the birds are perhaps the most striking, the extraordinary attitudes of the penguins being particularly ludicrous. Many of our readers who saw the photographs of the Emperor Penguins, etc., on the occasion of Mr. W. Eagle Clarke's presidential address to the Yorkshire Naturalists' Union, will be interested to know that many of them are reproduced in this report. These alone are worth more than the price asked for the volume. As a frontispiece is an excellent coloured plate of Weddell Seals and Emperor Penguins, and there are also maps shewing the course taken by the ship. We must congratulate Dr. Bruce and his colleagues on the valuable nature of their zoological work, and upon the magnificent manner in which the results of their observations have been given to the world.

The Vegetation of some Disused Quarries, by **S. Margerison.** Gaskarth, Bradford, 52 pp., with 33 illustrations, 1909. 3/-.

The title of this paper, which is reprinted from the Bradford Scientific Journal, 1908 and 1909, suggests to the West Riding botanist a most familiar subject, but one which holds out little of interest ; the sub-title, however, is more promising—' The Conquest of New Ground by Plants.' This aspect of plant life has excited considerable interest in recent years, both here and abroad, and has just received a fresh filip by the translation of Ernst's 'New Flora of Krakatau.' An opportunity like the latter rarely occurs, but we have in our limestone screes, cuttings, pit-hills and quarry tips, ample opportunities for studying the problems of invasion and succession, and though the areas mentioned are usually small, it is surprising how similar the processes are in the main.

Commonplace as the subject of the paper at first seems, it is obvious that the author has found for himself a most interesting piece of work, one which has grown in importance as the study has progressed.

The quarries investigated are in Calverley Wood, between Bradford and Leeds, and are along an escarpment in the Millstone Grit series, about a third of a mile long, and consist of rough rock, flagstones and ragstones, with bands of muddy and sandy shales resting on a bed of dark grey shale. The steep slope is planted with trees, probably on the site of primitive forest. It is of the dry oak type, with *Quercus sessiliflora* as the characteristic tree, one of the type very common in this part of the West Riding. The quarries range in age from one hundred years or more, down to some closed so recently as 1905. The method of enquiry was to examine the quarries in detail, and compare the vegetation on the tips and exposed surfaces, according to age. Starting with the youngest, he notes the 'making of the soil' and the organisms—bacteria, moulds, algæ, lichens, mosses and ferns, together with a few phanerogams, chiefly with good wind dispersal mechanisms—which form the 'pioneer vegetation,' and lead on to and prepare the way for a 'richer soil—humus,' in which the higher plants become more and more prominent. A suggestive chapter on 'Soil-gatherers and Soil-binders,' in which more examples might usefully have been given, paves the way for the consideration of 'Succession,' of which three transitional stages are recognised which result eventually in a closed association of hair-grass, bracken, blue-bell and soft grass, with a canopy of oak, birch and sycamore, found in the oldest quarries. 'So is the vegetation gaining upon our own local raw stones; multitudes of germs have perished, but the work goes on. The kindly green clothing, from stain of alga or moss protonema to deep verdant shade of woodland gradually envelops all. Individuals live, struggle, and die, but Nature sees to it that the mass of life gains all the time,' and we can well believe the author found his work 'intensely interesting—as is all field work.'

The photographs, which are very numerous, are excellent. The map is clear and of a suitable scale, and there are some interesting sketches of ling, showing variation in growth among the quarries; the sections of the leaves, however, are inaccurate.

The reprint before us is consecutively paged, but the reference numbers in the text are to the pages in the journal in which the papers appeared. In such cases it would be better to retain the original page numbers, and if desired, separate numbers could be added at the bottom of each page. These, however, are minor points. Mr. Margerison is to be congratulated on having done an excellent piece of work.

Before Adam, by **Jack London.** S. Werner Laurie. 308 pp.

The author of this book has dreamed dreams. He is a freak of heredity; at any rate, he says so. And he tells us of all the wierd things he did when he was on the world once before. 'With the doing away of one wife Red-Eye proceeded to get another. He decided upon the Singing One. She was the granddaughter of old Marrow Bone, and the daughter of the Hairless One. She was a young thing, greatly given to singing at the mouth of her cave in the twilight, and she had but recently mated with Crooked Leg.' And so on. They fought. Red-Eye evidently got the Singing One, and the author doesn't know how many wives since! Then there was Lop Ear, Long Lip, Swift One and Chatterer. But though they were all in the trees and scratched themselves, etc., their narratives do not seem to possess that interest that the author has been able to impart unto other of his writings.

British Mountaineering, by **C. E. Benson.** London: George Routledge. 1909, 224 pp., 5/-

The author of this work is evidently an enthusiast, and appears to be at home in 'chimneying,' 'scrambling,' 'rambling,' 'bouldering,' etc. The results of his experiences are here given for the benefit of those who dare to follow in his footsteps—and the number of such 'ramblers' seems to be on the increase. He also gives advice as to the kind of corkscrew, boots and nails, compasses, maps, screws, etc., to be used, and even gives details of ladies' wearing apparel necessary on such occasions. Remedies are also given for frost-bite, cuts, hæmorrhage, broken arms, legs, ribs, etc.; for fracture of the skull, and internal injuries. There is a special chapter on the dangers of mountaineering, and in every way the author is enthusiastic in the cause of this *healthy* exercise. There are several photographic illustrations of 'face climbs,' 'difficult cracks,' 'tough bits,' 'chimneys,' etc., from which it would appear that the author has been successful in securing snap-shots of enthusiasts in absurd positions in exceedingly dangerous situations. Possibly it is to their credit. Anyway we strongly recommend the book to any who are thinking of spending a holiday in trying to break their necks in scaling difficult rock faces.

The Greatest Life, by **Gerald Leighton,** London: Duckworth & Co. 275 pp., 5/- net.

In this work we find Dr. Leighton away from his snakes and lizards, and dealing with a problem which deals with the origin and development of character. 'The Greatest Life is that which most nearly approaches the highest ideal which has been conceived by human intellect, irrespective of the source of that ideal ; and the problem that such a life involves is—How may a man attain to it ? ' In dealing with the present religious problems, Dr. Leighton points out that 'Man will not for ever be content with the child-treatment in his mental sphere, and indeed his discontent is becoming more and more apparent every day. In all religious systems which permit of individuality of thought, this sympton is prominent. From a thousand pulpits comes the cry that modern education is making men less religious. It is not true. Men were never more religiously inclined than they are to-day, but they are demanding a presentation of religious truth which shall be a living one, and not a fossil. The food supplied is indigestible and insufficiently nourishing. They ask for meat and, at the best, are offered milk. Our systems of religious teaching have not kept pace with the march of human intellect.' The author deals with the Making of a Man ; the Development of the Soul ; Evolution of Physical Immunity ; the Making of a Man's Mind ; Mental Immunity ; Moral Immunity, etc., etc. There is much in the book to think about.

From the press of Mr. T. Werner Laurie has been issued **Gilbert White and Selborne,** by **H. C. Shelley.** It is by no means a novel subject, but one that is always refreshing. In it the author gives a well-thought-out account of the Man, the Village, and the 'Natural History,' and is successful in making an entertaining narrative, which, though perhaps containing little that is new, is more compact than say Mr. R. Holt-White's 'Life and Letters.' The volume is printed in large type, is well illustrated, and has an artistic cover.

MUSEUM NEWS.

We notice from the Sixtieth Annual Report of the **Ipswich** Museum that many important 'Bygones' have recently been added to the collection.

The Shells, Minerals and Butterflies in the **Stockport** Museum have recently been re-arranged, and an Index Catalogue of the Minerals is in preparation.

Mr. C. Davies Sherborn has presented to the Natural History Museum, **South Kensington,** a valuable collection of specimens of the hand-writings of naturalists, consisting of about eight thousand letters and other documents.

We have received part 3 of Vol. I. (pp. 219-355, 10/- net), and Vol. II., part 1 (139 pp., 7/6 net), of the Annals of the **Natal Government Museum,** edited by the Director, Dr. Ernest Warren, and published by Messrs. Adlard & Son, London. Both are well printed and illustrated by several excellent plates. In the former, Mr. G. A. Boulenger describes some Fresh-water fishes, batrachians and reptiles (including new species) from Natal and Zululand, and also writes on *Clarias capensis*. Mr. C. T. Regan describes some fishes from the coasts of Natal, Zululand and Cape Colony, and the Rev. Father Franz Mayer gives a short study on Zulu Music, the word 'Music' being applied to the noise made by the wierd primitive 'instruments' which are illustrated. There is also a charming group of Zulu 'musicians.' The Director has a lengthy and scholarly monograph on Natal coast Hydroids. In the second publication the Rev. A. T. Bryant has a remarkable paper on 'Zulu Medicine and Medicine-Men' ; the Director writes on '*Lafœa dispolians* n. sp., a Hydroid parasite,' and on 'Natal Termites' ; and Dr. Broom has some interesting observations on 'the Dentition of *Chrysochloris*,' and on 'the Tritubercular theory,' a subject recently referred to in these columns.

BRITISH MUSEUM NATURAL HISTORY 9 OCT. 1909

TO BOTANISTS AND GEOLOGISTS.

Wynnstay Hotel and Posting House

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OSWESTRY.

I beg to draw the attention of naturalists to the very fine and interesting Geological and Botanical features of the district in the immediate neighbourhood of Oswestry.

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Last year we had a large party of Geologists from London staying here during the August Bank Holiday, and another party from Liverpool and Yorkshire during the Easter Holidays, both of which were very much pleased with their visit.

Extract from letters from the Hon. Secs. of the London and Liverpool Geological Societies:—

"I can state that the members of our party were fully satisified with the accommodation the Wynnstay, and were in every way pleased with the arrangements made for their comfort."
—*Hon. Sec. London Society.*

"It was unanimously expressed by all the members who were present at our meeting last Easter, that the Wynnstay Hotel was one of the most comfortable they had experienced. Though dealing with a large party, arrangements were so admirable that there was not the slightest hitch in any department."
—*Hon. Sec. Liverpool Society.*

The following are particulars of a day's excursion which may be made from this town. Details for other days can be had by applying to the Landlord. *Please write for particulars:—*

Glyn Ceiriog. Drive to Selattyn. Offa's Dyke, Carboniferous Limestone, Glacial Overflow. Walk to Cae Deicws. Fossiliferous Bala beds and igneous intrusions. Thence to the igneous rocks about Llanarmon. Drive through Glyn to Castle Mill. Carboniferous Limestone. Back to Oswestry by lower road.

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A Monthly Journal of General Irish Natural History.

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PRESS OPINION.

" We have nothing but praise for this charming book. It has been well said that 'to master thoroughly the story of the city of York is to know practically the whole of English history,' and the authors of this new history have demonstrated the truth of this opinion. From that almost prehistoric time when the Celts settled in *Eburach*—the field at the meeting of the waters—through the Roman occupation and fortification of *Eburacum*, and on through the Anglian development of *Eoferwik*, and the Danish colonisation of *Jorvik—i.e.*, Yorwik—we are led on to the *York* of Norman times, and so through mediæval ups and downs to the city as we know it to-day. Across its stage have passed Julius, Agricola, Hadrian, Severus, and Constantine; Edwin, Siward, Tostig, Harold; William the Conqueror and Edward, *Malleus Scotorum*, Queen Phillipa and the fair Margaret, James I., and all the Stuart kings; Fairfax and Cromwell, and the gay, dashing Cavalier, Prince Rupert. And parallel with these there have been the leaders of religious thought, and the grand old Minster, looking calmly down on scenes of war and revolution. This is the story that is told so admirably by Messrs. Brockbank and Holmes—a story which no resident in or visitor to York should leave unread. No pains have been spared by the publishers to give the letterpress a perfect setting; binding, paper, illustrations, and general finish are alike admirable."

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THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY
T. SHEPPARD, F.G.S., F.S.A.Scot.,
THE MUSEUM, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

BRITISH MUSEUM NATURAL HISTORY

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
J. GILBERT BAKER, F.R.S. F.L.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S.,
T. H. NELSON, M.B.O.U.,
GEO. T. PORRITT, F.L.S., F.E.S.,
JOHN W. TAYLOR,
WILLIAM WEST, F.L.S.
RILEY FORTUNE, F.Z.S.

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YORKSHIRE NATURALISTS' UNION.

SECTION FOR VERTEBRATE ZOOLOGY.

(President—Riley Fortune, Esq., F.Z.S.)

Two Meetings will be held at the Leeds Institute, Leeds, at 3 p.m. and 6-30 p.m. respectively, on Saturday, November 20th, 1909.

Business (at the Afternoon Meeting:—

To consider and pass the Sectional Reports for 1909, and to elect Officers for 1910.

To consider and pass the General and the Financial Reports of the Yorkshire Wild Birds' and Eggs' Protection Acts Committee for 1909, and to elect the Officers and Committee for 1910.

The Convener of the Yorkshire Mammals', Amphibians', Reptiles' and Fishes' Committee will read an Interim Report, and and will propose the re-election of this Committee.

At the Evening Meeting (6-30 p.m.) the following Papers will be read :—

"Bird-Life at the Zoo," by Mr. Riley Fortune, F.Z.S. ; "The Extinct Vertebrates of the East Riding," by Mr. Thos. Sheppard, F.G.S. ; and "The Relationship of Food to Migration," by Mr. Rosse Butterfield.

Lantern-slides will be exhibited and described by Mr. Oxley Grabham, M.A., M.B.O.U., Mr. Sydney H. Smith, and others.

Any Member or Associate of the Y.N.U. is invited to attend, and to bring any notes, specimens, lantern-slides, etc., and is requested to bring forward any matters of interest connected with the work of the Section, and to take part in any discussion.

Will Officials of the Affiliated Societies kindly notify their Members.

NOW READY.

Transactions of the Hull Scientific and Field Naturalists' Club.

VOL. IV. PART II. **PRICE 2/- NET.**

CONTENTS:—

Notes on a Collection of Roman, etc., Antiquities from South Ferriby in North Lincolnshire. Part II. (Plates II., III., IV., V., VI., VII. and VIII). Thomas Sheppard, F.G.S., F.S.A. Scot.
Additions to the Diatomaceæ of the Hull District. R. H. Philip. (Plate IX.).
Catalogue of the Specimens in the 'Lether' Collection and of the Cornbrash Fossils in the Hull Museum. T. Sheppard, F.G.S., and H. C. Drake, F.G.S.
On a Specimen of *Eryon antiquus* Broderip from the Yorkshire Lias. T. Sheppard, F.G.S.
Fungi in East Yorkshire in 1908. Wilfrid Robinson, B.Sc.
Palæontology in East Yorkshire, etc., in 1908. H. C. Drake, F.G.S.
List of East Yorkshire Spiders, Harvestmen and Pseudoscorpions, etc. T. Stainforth.
East Yorkshire Botanical Notes. J. Fraser Robinson.
Additional Localities for the Flora of the East Riding. J. J. Marshall.
The Committee's Report on the Work of the Club during 1907-8.
SHORT NOTES :—Note on Mollusca, J. W. Boult ; Some North Lincolnshire Spiders, T. Stainforth ; A Tribute : W. R. Bromby, E. L.

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NOTES AND COMMENTS.

NON-GLACIAL STRIÆ.

The accompanying illustration is from a photograph of an interesting section on the Sedbergh golf-course, which was examined by the members of the Yorkshire Naturalists' Union on their recent visit to the district. It shows the Silurian grits, polished and striated, as if by glacial action. The striæ, however, continue beneath the bed of rock shown on the right of the photograph, and are evidently caused by a land-slide.

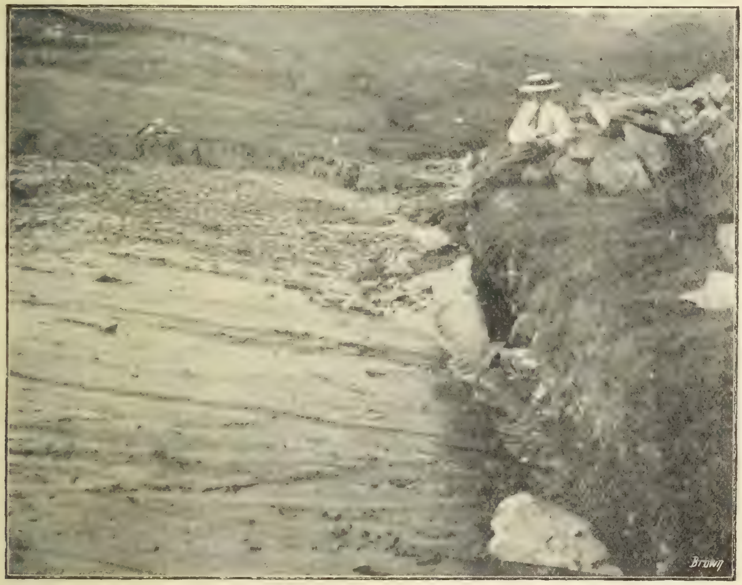

Photo by] [*Dr. T. R. Burnett.*

Grooved Rock, Sedbergh, looking west.

MYTILUS CLOACINUS IN THE RHÆTICS.

In the recently issued 'Proceedings of the Bristol Naturalists' Field Club,' Mr. J. W. Tutcher gives an interesting account of 'The Strata exposed in constructing the Filton to Avonmouth Railway'; with palæontological notes. In these he describes and figures *Mytilus cloacinus* sp. nov. from the Rhætic bone bed, Aust Cliff. In 1903 Mr. H. C. Drake, F.G.S., spent some time collecting in the bone bed at Aust Cliff, and some of the specimens he obtained are now in the Hull Museum. Amongst them is a *Mytilus*, which we have submitted to Mr. Tucher, who informs us that it is the same as he describes as *cloacinus*.

A NEW SPECIES.

The following is the description given by Mr. Tutcher :—'*Mytilus cloacinus* sp. nov. Anterior outline slightly arcuate, ventral margin rounded, posterior margin gently convex, as far as the hinge line, which is straight, and equals one-third the length of the shell ; beak angle, 40 degrees ; valves obtusely carinated from the beaks to the antero-ventral border, sloping evenly from the carina to the posterior margin, and sharply on the anterior sides ; growth halts well marked. The specimens are generally casts ; some fragments of the shell which have been observed do not exhibit any ornament. Dimensions :—length, 42 mm., width, 21 mm., thickness, 12 mm. ; geological position, lower Rhætic. The specimen figured is a nearly complete cast from the bone bed at Aust Cliff. Examples have also been collected from the bone beds at Sedbury and at Charlton. This fossil appears to be not uncommon on the bone bed horizon, but, as far as I can discover, it has been found at no other level.'

PROFESSOR P. F. KENDALL.

Our readers will be pleased to hear that a member of the Editorial staff of *The Naturalist* has been selected for the position of President of the Yorkshire Geological Society, which for the past half century had been held by the late Marquis of Ripon. Professor Kendall's excellent work in Yorkshire, as well as the great influence he has personally had in furthering geological study in the county, have been such that his selection as President of the County Society was an easy matter. We only hope that his connection with the Yorkshire Society may be as long as that of the late Marquis of Ripon. Professor Kendall was President of the Yorkshire Naturalists' Union a few years ago.

◆

The Annual Meeting of the Yorkshire Naturalists' Union will be held at Scarborough on Saturday, December 11th.

In the index to 'Bookprices Current' just issued, we find the first entry on page 688 is 'Entomology (continued) : Pearson, W. H., Hepaticæ of the British Isles.' One wonders what the position of these insects is from a Cataloguer's point of view.

Sir Thomas H. Holland, K.C.I.E., F.R.S., has been appointed to the Chair of Geology at the University of Manchester, in the place of Prof. W. Boyd Dawkins, who has resigned. Prof. Dawkins served on the Geological Survey between 1861 and 1869, and was appointed curator of the Manchester Museum and lecturer in geology at Owen's College in 1870, and Professor of Geology and Palæontology on the foundation of the Manchester University.

THYMUS OVATUS IN NORTH YORKSHIRE.

J. G. BAKER, F.R.S., Etc.,
Kew.

In a paper which appeared in the 'Journal of Botany' for 1908, page 34, Messrs. Domin and Bruce Jackson distinguished four so-called species of Thyme in Britain, viz., *T. ovatus* Miller; *T. glaber* Miller; *T. præcox* Opiz, and *T. Serpyllum* L.

T. Serpyllum is distinguished by its narrow leaves, long trailing shoots, and capitate inflorescence, and is, I believe, the common Thyme of Yorkshire. From this, *T. ovatus* differs by its broader leaves, inflorescence consisting of distinct whorls of flowers, and by the absence of long trailing shoots. Two specimens from North Yorkshire are now before me as I write, one from banks between Sandhutton and Carlton Miniott, near Thirsk, collected by the late Mr. T. J. Foggitt, and a second collected by myself from Kitscrew Wood, near Hovingham. *T. ovatus* Miller is the plant figured as *T. Chamædrys* by Boswell-Syme in the third edition of 'English Botany,' but is not the true *T. Chamædrys* of Fries, which is the same as *T. glaber* of Miller. This *T. glaber* of Miller is reported by Mr. G. C. Druce from Widdy Bank, on the Durham side of the Tees, but I have not seen either this species or *T. præcox* from Yorkshire, though I note that Mr. Druce (Report of the Botanical Exchange Club' for 1908) gives *T. glaber* as a Yorkshire plant. *T. glaber* differs from *T. Serpyllum* by its glabrous stem and broader bright green glabrous leaves and short shoot.

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The Annual Report of the Marine Biological Association of the West of Scotland for 1908 shews that good work is being done at the Millport Station, and that it is being encouraged in a practical way.

Vol, I., No. 1 of the **Journal of the Torquay Natural History Society** (48 pp.), has recently been issued, and besides the Society's Sixty-fifth Annual Report, contains some original contributions, and some reports of lectures. Some of the latter, particularly those occupyng two or three lines, might well have been omitted. We hurriedly turned to the paper with the tempting title, 'Ancient Phœnician Settlements in Cornwall and Devon,' but only to find the subject dismissed in two and a half lines. Possibly there was a reason for this. Amongst the contributors we notice the names of Messrs. A. J. Jukes-Browne, H. J. Lowe, A. R. Hunt, etc. The longest, and perhaps the most useful contribution, is a list of the Diatoms of the Torquay district, and in this we were pleased to notice that the author had to thank a Hull naturalist for help in determining difficult species. It would have been an advantage if the same person had also read the proofs, as misprints are far too frequent. If a little more margin had been allowed to the pages, their appearance would have been improved.

NORDMANN'S PRATINCOLE IN YORKSHIRE.

AN ADDITION TO THE COUNTY AVIFAUNA.

R. FORTUNE, F.Z.S.

EARLY in August I heard that a Collared Pratincole had been shot in the North Riding. This species is of sufficiently rare occurrence to make the event worth investigating.

I found that it had been shot in mistake for a Golden Plover, by Mr. W. S. Charlton, of Northallerton, at Reedholme, near Danby Wiske, on August 17th. Mr. Charlton was after duck at the time, and was waiting beside some water in the shelter of a bank, when a flock of Green Plover flew over. The Pratincole was flying with them, and was the only one of its kind.

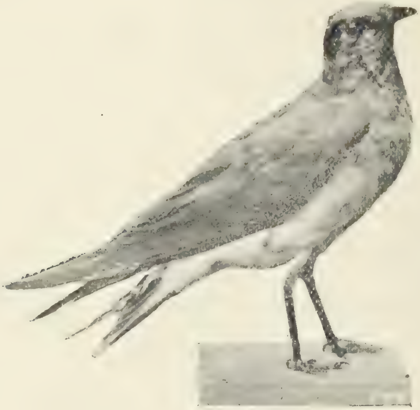


Photo by] [*R. Fortune*, **F.Z.S.**

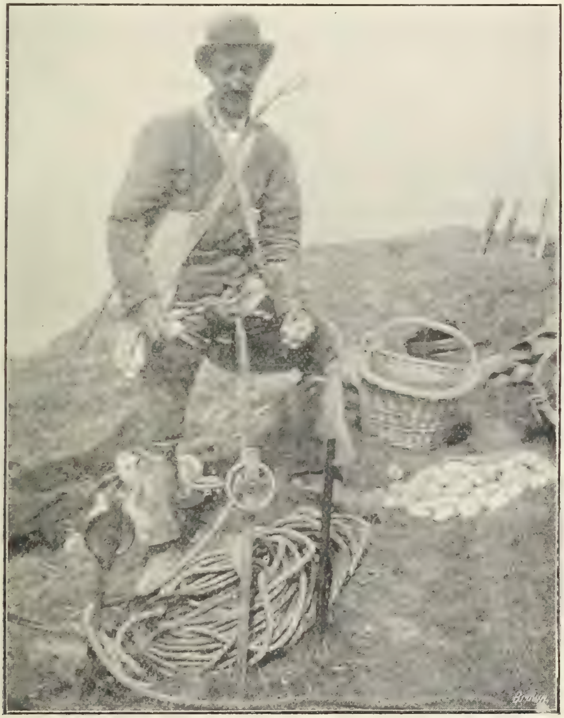
Nordmann's Pratincole (*Glareola melanoptera*).
Shot near Danby Wiske.

Mr. Charlton was kind enough to allow me to have the bird for photographing, and it was sent on by Mr. Lee, of Thirsk, who stuffed it. Upon arrival I saw that it was not the common Pratincole, and it proved to be a specimen of Nordmann's or Black-winged Pratincole, *Glareola melanoptera*, and the first to be recognised as a Yorkshire specimen.

It differs distinctly from *Glareola pratincola*, in the secondaries not being tipped with white, and in having the under wing coverts and axillaries jet black instead of chestnut. The specimen resembles the figure of the bird of the year in Dresser's 'Birds of Europe,' with the exception of having the dark bridle-like marking round the throat, though this is not nearly so conspicuous as in the adult plumage of *G. pratincola*.

A VETERAN 'CLIMMER.'

On 11th September, Harry Marr, one of the old Bempton climbers, died suddenly at Buckton from heart failure. A son of the soil, born and bred in Bempton, and a typical East Yorkshireman, his speech, manners and gait smacked strongly of the Shakespearian ' Flavour of the saltness of time,' and all frequenters of the cliff must regret the disappearance of this picturesque figure, one of the few remaining links with a past generation. He was sixty-three years old at the time of his death, and had earned his living from boyhood by working on the land, like most of the climbing fraternity. In appearance he was tall and handsome.



[Photo by *Oxley Grabham.]*

Harry Marr and his 'climming' outfit.

At the age of thirty, not being engaged at the hirings, and consequently having little to do, he joined Ned Hodgson's gang on the Bempton and Speeton Cliffs—that veteran who taught so many young ideas how to climb—and after a season's apprenticeship with him, went to Londesborough, Senr., completing with his uncle, Rd. Marr, the gang which climbed the cliffs from Cat Nab to Scale Nab, including the famous Dor, the same ground which he had climbed to the end of the 1909 season, and which, had he lived, he would no doubt have continued climbing till he was seventy, for, in spite of increasing age and stiffness, the old man felt as much at ease on the rope as ever. His greatest difficulty seemed to be getting over the edge of the cliff—once on the swing, and he was perfectly at home. The faculty of climbing had, in fact, become ingrained in him, and had he been compelled to roll over the cliff edge, it seems probable that he would have gone on with it, for when twitted by his friends with getting too old for the job, he always cheerfully replied that 'he could climm best of owt.' His life apart from climbing, consisted of the usual routine of an agricultural village, and calls for no comment. It is in the personalty of the man and his climbing experiences that our interest lies.

At sixty-three he was the oldest climber on the cliff, though in length of service at the game, the veteran Ned Hodgson, who gave up some ten years ago, could beat him. When he commenced, climbing was not the serious business that it is now, there being insufficient eggs to make it worth while gathering them every day, and many off days were spent in working on the land. The number of men in each gang was three, as against the present four, and all the cliff was rent free, the men arranging between themselves what ground each gang was to work. No such thing as rent was ever known till the increase of eggs, owing to the protection afforded by the Act of 1880, gave some of the men an incentive to owst the older climbers from part of their ground, and they went to the farmers and offered to pay for the privilege of egg-gathering. The regulation head-gear was a box-shaped top hat, known as a 'mullah,' also fashionable for executions, both processes being intimately connected with the use of the rope. The lowering was done by running the rope over one thigh, not round the waist as now, and the climber must have had much more work, as the lowering man could not have had so much holding power, whilst long hauls were brought up, and only two men were pulling at the top against three now. One man named Coultas used to climb the broken cliff between the Rowlup and Dor by himself on a single rope, a thing never dreamt of now. The climbing is getting reduced to an exact science, more gear and more help being used than in the old days, when a man trusted more to his own strength and agility.

The old man possessed an imperturbable good temper, with a quiet dry humour, and a dialect of the past centuries, which made him an entertaining raconteur; and though his narratives were perhaps somewhat overdrawn where the first person singular was concerned, who shall grudge him the enlarged perspective with which old age views its younger exploits? His death removes a notable landmark from the ranks of the climmers.

> 'Let not ambition mock their useful toil,
> Their homely joys and destiny obscure;
> Nor grandeur hear with a disdainful smile
> The short and simple annals of the poor.'

E. W. W.

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Consider the Butterflies How they Grow, by **L. P. Stubbs.** Elliot Stock. 62 pp. Judging from the title of this book, its price, its frequent references to the Holy Scriptures, and the texts written here and there, it is evidently intended as a Sunday School prize, though the 'butterfly' on the cover is surely very different from anything in the heaven above, in the earth beneath, or in the waters under the earth. Mr. Stubbs' narrative of the life of a butterfly is interspersed with poems about the Nettle's lament over a chrysalis, the Nettle's surprise, Butterfly on wing recognises Nettle, Nettle recognising Butterfly in the air, etc., which, however, 'readers of a strictly scientific taste may omit,' as he also may the message to King Hezekiah, King David's sigh, the address of Jehovah to the patriarch, etc.

For a somewhat similar purpose we presume **Nature,** by **J. H. Crawford** (Swan, Sonnenschien & Co., 5/-) has been published. It is illustrated by all sorts and sizes of blocks, and deals with 'Sunlight in Strange Places'; 'The Library and the Press'; 'Atmosphere in the Schools'; 'St. Valentines'; 'Nature's Easter'; 'Madonna of the Pastures'; 'Midsummer Afternoon,' etc., etc. We should also like to congratulate the publishers on possessing the biggest and messiest rubber stamp with 'presentation copy' upon it, that we have seen. It would have looked better if it had not been placed diagonally across the title page, though possibly its size necessitated this.

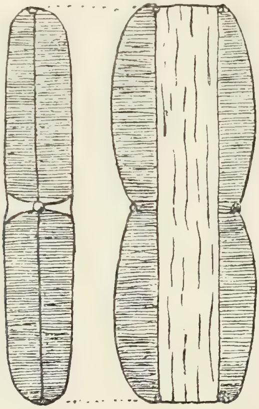
The Manchester University Press has published **Birds Useful and Birds Harmful** (6/-), by **Otto Herman** and **J. A. Owen,** both well-known scientific writers, and not of the talk-about-nothing style, which is becoming so common a feature with ornithological books now-a-days. In its original form the present work was prepared by Mr. Herman at the request of the Minister for Agriculture in Hungary, for the guidance of farmers, fruit-growers and gardeners. The mass of useful information it contains, however, will appeal to many others besides these; and a perusal of the work will surely do much to prevent the slaughter amongst our useful birds which is continually going on. Would that it were possible to place this book in the hands of every gamekeeper in this country, and make him read it! The volume also has useful chapters on bird structure, bird protection, nesting-boxes, etc.

INTERESTING DIATOM NEAR HULL.

R. H. PHILIP.

In the 'List of Diatomaceæ occurring in the neighbourhood of Hull,' published in 1859 by George Norman, appears the following record :—'*Amphiprora constricta* Ehr. Very common in brackish water. Pure near Marfleet, Victoria Dock Timber Pond, Marsh Chapel, Garrison Moat, Dairycoates, under Railway Arch.'

I had frequently sought for this form in the neighbourhood of Marfleet, but without success until early in May this year, when, on the occasion of a visit of the Hull Scientific Club to the excavation now going on for the new dock, I found it in great abundance and pure of any mixture with other species, in water oozing from the face of cuttings and forming pools at the bottom of the excavation.



Stauronella constricta Ehr. (Mer.). Syn. *Amphiprora constricta* Ehr.
Stauroneis amphoroides Grun.

This diatom has given a great deal of trouble to the authorities by its anomalous structure, and by three leading diatomists it has been assigned to three distinct genera. Ehrenberg gave it the name of *Amphiprora constricta*, under which it appears in Norman's list. Donkin, who found it on the Northumberland coast, called it *Navicula simulans*, and Grunow describes it as *Stauroneis amphoroides*.

When Mr. F. W. Mills and myself were revising Norman's list, it seemed to us that the last of these names was the most appropriately descriptive, so it appears in the illustrated

'Diatoms of the Hull District' under that title. Since then, however, Mr. C. Mereschkowsky has published an interesting paper ('Ann. and Mag. Nat. Hist.', S. 7, Vol. VIII., pp. 424-434, Pl. VIII.), in which he points out that it has features which separate it distinctively from any of the three genera to which it has previously been assigned. He considers that the only proper method of dealing with it is to place it in a genus by itself, and proposes to give it the name of *Stauronella constricta* (Ehr.) Mer.

It is rather curious that, although according to Norman's record it was not at all uncommon in his day in this neighbourhood, it seems to be very little known to some of the leading diatomists of our time. Dr. Van Heurck for instance, who describes it under Donkin's name of *Navicula simulans*, states that he does so only from Donkin's work, never having himself seen any authentic specimen. M. Peragallo also ('Diatomées Marines de France') figures under the name of *Stauroneis constricta* (Ehr.) Sm. ,a dwarfed and emaciated form, which one can hardly recognise as the same thing as that found at Marfleet, and says, 'I have never seen the large forms of this species recorded for the Ocean and the Arctic Seas. Small forms such as that I have drawn are perhaps special to the warm seas.' It is possible, therefore, that outside of this district, it is something of a rarity, and even here I have only found it once previously (in the Victoria Dock Timber Pond). The Dairycoates and Garrison Moat localities, named by Norman, have long ceased to exist.

The figures in Dr. Smith's 'British Diatomaceæ,' usually so excellent, do not do justice to this species. In the valve view, the sides are made to taper towards the median constriction, which is not the case in any specimen I have seen. In the girdle face aspect, the drawing of two young frustules that have hardly completed self division, gives but a poor idea of the well-developed connecting zone of a mature specimen.

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Mr. Wm. Blackstock has presented a good collection of minerals to the Haslingden Museum.

A collection of butterflies, etc., said to be valued at about £2000, has been presented to the Accrington Museum by Mrs. Robertson-Aikman.

From the annual report of the Kings Lynn Museum we learn that amongst the additions are one hundred skulls of Norfolk Birds; a 'Camberwell Beauty,' taken at Hillington in 1884, and several rare moths, including three taken in West Norfolk, which are additions to the British insect fauna.

ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

REV. C. E. Y. KENDALL, B.A., J. DAVY DEAN, AND
W. MUNN RANKIN, M.Sc., B.Sc.

(*Continued from page 359*).

Neritina is a true non-calcareous species, while *Ancylus* occurs in both calcareous and non-calcareous rivers, and can exist in shallower and swifter streams than the former. *L. auricularia* is rare, and is of a small acute form. *Unio margaritifer* is local, but abundant in the deeper pools of the lower river. This interesting species is characteristic of a northern fauna, its range extending from the Conway and Dee throughout the north-western counties into Scotland, right into the Highlands. It is a favourite food of the otter, and seems to abound in rivers where this animal is common.

(*c*) THE SMALLER RIVERS (Example—R. Bela.)

OPEN WATER.	REED BELT.	MARSH.
L. pereger Müll.	*Planorbis carinatus* Müll	?
Neritina fluviatilis L.	*Bithynia tentaculata* L.	

This is a much slower moving river than the Lune, and shews interesting features. In the reaches examined *Ancylus* was absent. *Limnæa pereger* and *Planorbis carinatus* seem plentiful. The latter is a southern and eastern type, and is only local in the north-western counties. This is the only locality for it in Lonsdale.

NOTE.—We have no records for the marsh section of these non-calcareous streams. Captain Farrar gives the following for the margins of the becks of the Lake District, which note is of interest, and may apply to the examples already taken.

OPEN WATER.	MARSH.
L. pereger Müll.	*Agriolimax lævis* Müll.
Ancylus fluviatilis Müll.	*Hygromia fusca* Mont.
	Pupa anglica Fér.

He states that *H. fusca* occurs 'wherever sedges border the swiftly-running becks.' *Pupa anglica* is a moss feeder, and though occurring often in woods, this may be its true position.

5. HEATH MOORS.

§ I.—LOWLAND: Ditches and pools on the mosses.

OPEN WATER.	REED BELT.	MARSH.
Limnæa pereger Müll.	*Limnæa palustris* Müll.	*Planorbis spirorbis* L. *Pisidium obtusale* Pf. Rarely *Aplecta hypnorum.*

All these species are usually somewhat dwarfed in size, and are stained and corroded by the peat. The dominant species is *P. spirorbis,* which is usually very abundant. This species would seem to be restricted to the marshy ends of non-calcareous ponds, which are a dense mass of grass and small water plants, and to peat-drains and marshes. It ranges throughout the country in habitats of this kind. The form prevailing throughout this district is the var. *leucostoma* of Millet.

§ II.—Upland.

We have as yet no records of these.

WOODLANDS.

The woodlands of the district fall into two distinct types—the Ash type, characteristic of the Mountain Limestone, and the Oak-birch type, dominated by *Quercus sessiliflora,* characteristic of the Silurians and Millstone Grit Series.

The former type prevails between the valley bottoms and the pavements on the plateaux of the scar limestone. Below, the soil is damp and deep, and the shade noticeable, above, the soil is shallow and liable to drought, and the shade little better than that of scrub. The lower woods shew an admixture of Oak, the upper scrubs have little high growth, and are constituted of the shrubby associates of the Ash wood of the lower mid-slopes. Woods of this type are the most luxuriant of our British associations, not only in individuals, but also in species. The physical conditions are wholly favourable to an abundant life.

Beech woods are not native to the district, but where substituted in the Ash woods of the deeper and damper soils, show life conditions of a fairly distinct character, which justify a separate consideration.

The Oak-birch type of woodlands is that which prevails over most of the Pennine areas off the Limestone. It includes many wood associations though of a lower grade than is the case with the Ash wood type. In the higher associations there is lacking the variety of the scar woods, while in the dry heathy woods which stand at the bottom of a series of wood associations, the life conditions of soil and exposure are distinctly unfavourable to plant life, except of very specialised character. This poverty is reflected in the molluscan association.

I.—Ash Wood Formation.

(*a*) Damp Section : deeper soils of the lower wood.

Clausilia laminata Mont. Associated with :—

Arion ater L.
Vitrea cellaria Müll.
,, *nitidula* Drap.
,, *alliaria* Miller.
,, *radiatula* Ald.
Vitrea crystallina Müll.
Euconulus fulvus Müll.
Pyramidula rotundata Müll.
Helix hortensis Müll.
Ena obscura Müll.

This handsome species with a reputed partiality for the Beech and Ash, is characteristic of the bottom woods of the purer Ash. In such localities it is abundant under the large moss-covered stones or among the fallen branches and twigs.

Vertigo pusilla Müll. Associated species :—

Vitrina pellucida Müll.
Vitrea alliaria Miller.
Euconulus fulvus Müll.
Pyramidula rupestris Drap.
Hygromia rufescens Penn.
Vallonia costata Müll.
Cochlicopa lubrica Müll.
Pupa cylindracea da Costa.
Vertigo substriata Jeff (rare).
,, *alpestris* Alder.
Clausilia laminata Mont.
,, *bidentata* Ström.

This species, as evidenced by the association, is marginal to the lower wood, and is found among moss under stones in damp situations, or under top stones of a low crumbling wall, and can be taken in abundance throughout the limestone area. At first sight it would seem that the allied species *V. alpestris* should take its place here, but though often occurring with *V. pusilla* on the borders of Ash woods, its real position is in the damp section of the Oak-birch woods, as will be shewn under that heading. *V. pusilla*, too, is not confined to the north-western counties in the same way that *V. alpestris* is, occurring frequently in the Midlands, and being even recorded for Devonshire.

Hygromia granulata Alder. Associated species :—

Vitrina pellucida Müll.
Vitrea cellaria Müll.
,, *alliaria* Miller.
,, *nitidula* Drap.
Hygromia rufescens Penn.
,, *hispida* L.
Helicigona arbustorum L.
Helix hortensis Müll.

This species again is found on the margins of the Ash-woods, more especially just close to a low Ash or Hazel copse. Its abundance places it at once as one of the locally dominant species. It occurs in large colonies in the patches of *Potentilla anserina*, etc.

Sub-section—Beech Woods.

The noticeable feature of the Beech-woods is the fondness for them of the hispid shells—those which have a more than ordinarily fibrous epidermis. In this connection the habitat of *H. obvoluta* in the south is of interest, for being of the same nature, it is confined also to Beech woods.

Acanthinula lamellata Jeff. Associated species :—

Vitrina pellucida Müll.
Vitrea alliaria Miller
,, *pura* Ald.
Euconulus fulvus Müll.
Acanthinula aculeata Müll.
Carychium minimum Müll.
Acicula lineata Drap.

A. lamellata, a Northern type, is extremely local, but dominant over *A. aculeata,* where it does occur. *A. aculeata* belongs really to the Oak-Birch section of the northern district, but is well distributed throughout. The association of *A. lineata* is not always maintained. The association is characteristic of the leaf carpet which, lying in damp soil in the woods, is thickly permeated with fungoid growth.

Hygromia hispida L. Associated species :—

Vitrina pellucida Müll.
Vitrea cellaria Müll.
,, *nitidula* Drap.
,, *pura* Ald.
Cochlicopa lubrica Müll.
Carychium minimum Müll.
Hygromia rufescens Penn.

This species, which is usually of a smaller and more hispid form than the true type, is universally distributed, but occurs in marked abundance among dead beech leaves, especially towards the margin of the woods. We have taken it thus in great abundance, and of a large size in similar habitats in the Midlands, which would seem to strengthen the evidence as to its preference for the Beech. The distribution of this species in the Ash woods of the Carboniferous Limestone is maintained to an altitude of about 400 feet, thus forming a connecting link with the higher and drier woods, the association becoming restricted to *V. nitidula* and *V. pura.*

(*b*)—DRY SECTION : Shallow soils of the upper woods.

Clausilia bidentata cravenensis Taylor. Associated species :

Pyramidula rupestris Drap.
Pupa cylindracea da Costa.
Clausilia bidentata Ström.
Clausilia laminata Mont (rare).
Ena obscura Müll.

This well-known characteristic Craven shell is found in abundance on the limestone scars sheltering the lower wood. It is not a ground species like *C. laminata,* and is rarely taken on the trees. Unlike *C. bidentata,* it is entirely confined to the Carboniferous Limestone.

(*To be continued*).

REVIEWS AND BOOK NOTICES.

NEW BOOKS ON EVOLUTION.

The Berlin Discussion of the Problem of Evolution, by **E. Wasmann.** Full report of the Lectures given in February 1907, and of the evening discussion. Kegan Paul, Trench, Trübner & Co. 1909. 266 pp., 6/- net.

They seem to have exciting times in Germany, and in this volume Father Wasmann gives a record of a remarkable discussion which took place in a large crowded hall. A work purporting to be a record of this discussion was published by Dr. Burdinski, but it is alleged this does not give a full and impartial account of Father Wasmann's lectures. Evidently the Catholic priest has had a good hearing, a good criticising, and has given a good reply to his critics. The various remarks of the various professors and others who were on the platform and spoke, are dealt with seriatim. In Father Wasmann's opinion, they did not succeed in refuting him, and they provided him with the best possible proof that his opinions, as those of a Christian and a scientist, 'do not clash with the principles of really free research.' Whether the discussions here reported have advanced the study of evolution or not, we must leave our readers to judge for themselves after they have read the book.

The Making of Species, by **Douglas Dewar** and **Frank Finn.** London: John Lane. 400 pp. 7/6.

It sometimes happens that 'two great minds think alike,' and evidently one result of such an event is the present book. It is the outcome of conversations which 'we, the joint authors, had last summer . . . One of us took a degree in natural science at Cambridge, and subsequently entered His Majesty's Indian Civil Service, but continued his zoological studies in India as a hobby. The other, a naturalist from childhood, *nevertheless* [!], took a classical degree at Oxford, then received a technical zoological training, adopted zoology as a profession, and held for some years a position in the Natural History Museum at Calcutta.' It might have been added that the initials of one author are D. D., whilst oddly enough, the initials of the other are F. F. With these extraordinary qualifications, our authors decide to give biological science a fresh impetus, as at the present time, 'especially in England, it is in an unhealthy condition.' Their facts and philosophical studies are therefore blended, and the authors modestly affirm 'it is our belief that were Darwin alive to-day, his sympathies would be with us, and not with those who call themselves his followers.' There is no doubt his sympathies would be as the authors imagine! The theory of natural selection as enunciated by Darwin 'needs considerable modification,' and consequently Messrs. Dewar and Finn have indicated the directions in which the Darwinian theory requires modification. Post-Darwinian books on evolution are divided into four classes, all of which 'are characterised by defects.' Zoological science stands in need of constructive books on evolution; and the present volume is considered to supply that need. We learn that De Vries, Wallace, Prof. Poulton, and many others are obviously palpably wrong, and as we read on we cannot help humming to ourselves, 'Down with church and down with steeple; down with parson, down with people; down with every blessed thing, *but us*.' But our patience is sorely tried when we come to several pages headed 'Kay Robinson's Theory'; and then we remember having seen various favourable notices of 'The Making of Species' in a certain weekly! Personally we are sorry we cannot give to this new volume the praise that the authors obviously consider it deserves. Our own humble opinion is that the foundations of the Darwinian theory have not been shaken by a B.A. (Cantab) and a B.A. (Oxon). The publishers have done their work well, though the first word on the first plate is a misprint.

POPULAR NATURAL HISTORY.

Several volumes dealing with natural history from a popular standpoint have recently reached us. Foremost amongst them are the 3rd and 4th volumes of **The Book of Nature Study** (The Caxton Publishing Co.), the first two of which we have already noticed. Vols. III. and IV. are entirely botanical, well-written on up-to-date lines, and are well illustrated by plates (some coloured) and diagrams. Volume III. is in two sections—the first containing chapters on the life and growth of seedlings, the growth of the shoots from the bud, the growth of plants independently of seeds, and the importance of hairs in plant life, being written by Miss C. L. Laurie. The second section deals with some Common Flowering Plants, contains an Introduction, and chapters on Spring Flowers and Early Summer Flowers, and is by Dr. W. H. Long. In Vol. IV. Dr. Long continues his studies of Common Flowering Plants, and has also chapters on the Scots Pine, and on the arrangement of the plants described in their families or natural orders. Dr. F. Cavers, whose valuable contributions are well known to readers of 'The Naturalist,' writes on 'Ferns and their Relatives, Mosses and Liverworts, the Higher Fungi, Lichens and Moulds, Yeast and Bacteria'; Miss Laurie continues with articles on 'Woodland Vegetation, Plant Associations, and the Vegetations of Commons, Heaths and Moors.' These are all subjects that have been dealt with in this journal from time to time, and we can therefore strongly recommend these volumes to our readers.

Messrs. Cassell & Co. have published a second volume of **'The Nature Book'** (12/-). the first of which we had pleasure in recommending some little time ago. The present is even more interesting than the first of the series, and having regard to the general excellence of the matter, the many illustrations from photographs, and the general appearance of the work, is a very cheap and desirable volume. Every branch of natural history seems to be dealt with. Amongst the contributors we notice the names of Douglas English, F. M. Duncan, J. J. Ward, the late Joseph Lomas, and many others. A charming feature is the number of coloured plates mounted on tinted paper.

Messrs. Gowans & Grey, Glasgow, have sent us Nos. 18, 19 and 20 of their wonderful Sixpenny **Nature Books,** each of which contains sixty beautiful reproductions from photographs, and descriptive letterpress. No. 18 deals with Pond and Stream Life; No. 19, Wild Birds at Home (3rd series), and No. 20, Alpine Plants at Home.

The Natural History of Selborne, by **Gilbert White,** and **The Naturalist on the River Amazons,** by **H. W. Bates.** Edited by **H. B. Browne.** Each 96 pp. London: Edward Arnold, 6d.

The Editor of these two little volumes, in his capacity as Senior English Master at Hymers College, Hull, has exceptional opportunity of judging the needs of scholars in our public schools, and has made selections from the two volumes by White and Bates, so as to make the works of value and interest to young readers. By means of footnotes obscure passages are made clear, or supplementary information is given. The books are excellent; we only wish such volumes had been in use at schools twenty years ago!

An Ancient Scottish Stronghold: the Story of Dumbarton Castle, by **W. Chambers.** Dumbarton: Bennett & Thompson, 74 pp.

As the profits from the sale of this pamphlet are to be devoted to the fund for the establishment of a chair of Scottish History in Glasgow University, it is sincerely to be hoped it has a large sale. A carefully-written account of the castle is given, shewing the various uses to which it has been put from the earliest times; and there is an impartial description of the famous crannog of Dumbuck, though no reference is made to the 'antique' carvings which were then discovered upon modern American 'blue-point' oyster shells.

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

Transactions of the Yorkshire Naturalists' Union, Part 34, for 1908 [issued 1909]. Hull, A. Brown & Sons. 2/6 net.

This massive volume of some four hundred pages is not perhaps one that will be read straight away from cover to cover ; nevertheless it is exceedingly valuable. Fortunately the Union has two sets of publications, its monthly journal taking the notes more generally interesting and requiring more immediate publication. But there are many more lengthy papers, which, whilst not particularly appealing to readers of a monthly magazine, nevertheless require publishing in some form handy for reference. The present part contains the last four annual reports of the Union, in which are set forth the results of work of various departments ; a record of which any Society might be justly proud. Mr. C. Crossland then follows with the full lists of species collected on the Maltby and Grassington Fungus Forays ; these being supplementary to the recently issued Fungus Flora of the county. Mr. T. Sheppard contributes his bibliography of the geology of the northern counties, for 1902-1908. These lists formerly appeared in *The Naturalist*, but are better in these annual Transactions, as they include the particulars of all the geological papers, books and memoirs issued bearing upon the northern counties of England. It will be understood that they are of value to the student, and it is somewhat complimentary to find that they are used by H.M. Geological Survey. The present compilation contains details of over 1600 references. Following this are reprints of the well-known excursion programmes issued by the Yorkshire Naturalists' Union during the past four years, which contain most valuable natural history records bearing upon all parts of the county.

The Goole Scientific and Field Naturalists' Society has issued Vol. I. of its Transactions for 1908-9 (42 pp.), in which we are glad to find that, notwithstanding its meagre membership of thirty-four, there is no lack of enthusiasm, and there are evidently some careful workers. Besides the list of officers, etc., and the Committee's report, there are notes on 'The Flora of Westfield Bank,' by Mr. A. E. Greaves, who also has a note on 'The Flora of the New Railway Embankment and of the Site of the New Dock in Bridge Street,' ; Mr. T. G. Kirby writes on 'The Birds of the District,' with notes on unusual visitors by Mr. T. Bunker. Mr. W. Jackson gives 'Notes on some Mycetozoa found in the neighbourhood of Goole' ; and reprinted from the 'Goole Times' are 'Some references to the ancient History of Goole and Marshland,' by Mr. L. Holmes, and a 'Visit to Adlingfleet.' If we must grumble, we should like to complain of the small size of the pages (7″×4⅝″) instead of ordinary 8vo, and if a further publication is issued by the Goole Society, we should like to suggest that it contains a detailed history of the Goole Scientific Societies and their work ; say by our old friend Mr. Bunker.

The **Liverpool Botanical Society** is to be congratulated on the uniform excellence of its first volume of Transactions (Liverpool University, 109 pp., 4/-), which has been printed at York. Every contribution is of great value and interest, and we hope that the Society may long continue to do such good work. Prof. R. J. H. Gibson writes on 'A Classification of Fruits on a Physiological Basis' ; and on 'The Problem of Photosynthesis,' ; Messrs. A. Wilson and J. A. Wheldon describe *Cladonia luteoalba*, a new Lancashire Lichen ; *Honkenya peploides*, a Maritime pleiogamous species' is contributed by Mr. F. N. Williams ; Messrs. J. A. Wheldon and W. G. Travis give an exhaustive list of South Lancashire Hepatics ; Mr. Travis has a useful paper 'On Plant Remains in Peat in the Shirdley Hill Sand at Aintree, S. Lancs.' ; Mr. C. T. Green records the occurrence in Britain of an interesting micro-fungus, *Cintractia cingens*. An unusually useful contribution is the Biographical List of Deceased Lancashire Botanists, with a chronological enumeration of their published works and papers. This is by the Editor, Mr. A. H. Dallman, and Miss M. H. Wood.

THE STUDY OF A FIRCONE.

Mrs. E. HUGHES GIBB.

WHAT is a fircone ? and is it worth serious study ?

The first of these questions is carefully answered in the following article ; the second one the reader must answer for himself at the end. In case, however, he may be deterred by the dry look of many figures and diagrams, and may be tempted to guess at a negative, and to drop his enquiry, I will venture here at the beginning to express my belief that anyone who will allow himself to be attracted by the alluring spiral lines of the fircone, and will give a little time and attention to the study of its arrangement, will find himself amply rewarded, nor will he be likely to go away without some new, perhaps even some startling thoughts to which those spirals point the way. One might venture to say that some of the deepest philosophy of life is epitomised within these cones ; but this is no unusual phenomenon in a world in which the infinitely great is so commonly to be discovered hidden within the bosom of the infinitely small.

Every fircone is a strongly compressed spiral, which, through its compression, presents the appearance of a cone with one series of spirals running to the right, and another series to the left. The true spiral which in its coil passes through every scale in the fircone, is invisible, and must be found by calculation.

Physiologically a fircone is a transformed branch, the leaves of which, undertaking a different work from that of the ordinary pine ' needles,' have changed their form to suit their purpose ; and have become hard, woody scales, behind which the winged seeds may safely shelter.*

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* One may remark in passing that these transformations of organs to different uses are quite common in the plant world, every coloured petal being, in fact, a leaf altered with a purpose, and many green sepals, or flower-envelopes, being capable of developing brilliant colouring in order to serve as petals when these are lacking, or have been devoted to other uses (*e.g.* in Christmas rose, whose true petals are converted into small green honey pouches), returning to their plain green colour when the need to attract insect visitors is over. The case of the fircone, then, is no unusual one ; and, as in the coloured flower the transformed leaves are compressed into close whorls instead of being distributed along the stem in the usual way, so in the fircone the scales are pressed together as closely as possible.

In studying the general arrangement of leaves upon the stems of plants, botanists have found that, although the fact is so often masked by circumstances that it is by no means patent to ordinary observation, the fundamental principle of leaf arrangement is a spiral form, in which if we count the number of coils made by the spiral round the stem, and the number of leaves it passes through in each complete turn, a series of numbers is shewn, of which any two contiguous ones when added together will make the next in the series. These are the so-called phyllotaxian numbers, usually written with No. of coils as numerators and No. of leaves as denominators, thus :—$\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, $\frac{8}{12}$, and so on.

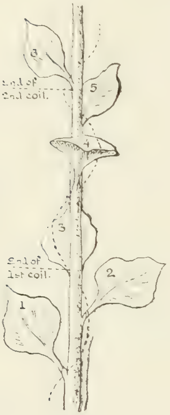

FIG. 1.

From *Pittosporium undulatum.*

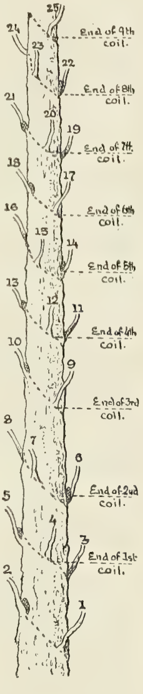

FIG. 2.

From Common Holly.

In fig. 1 representing six leaves growing up a stem (taken from *Pittosporium undulatum*) the coil, represented by the dotted line, passes through three leaves in its first complete turn, and through two more in its second turn, thus exhibiting the first two numbers of the above series :—$\frac{1}{3}$, $\frac{2}{5}$. The sixth leaf stands directly above the first, shewing that for this particular plant the order of the leaf arrangement is completed in five leaves. However long the shoot might be, the positions of those five leaves round the stem would just be repeated over and over again, and as the sixth leaf stood over the first, so would the eleventh, sixteenth, twenty-first, and every fifth leaf onward, the coil passing through three and two leaves alternately in never-ceasing monotony of rhythm. The rose has a similar series of five leaves, and sings to the same simple song of coil and leaf, 3 ,2 ; 3, 2 ; 3, 2.

A slightly more complicated arrangement is shewn in fig. 2, from the common holly, whose prickly leaves have been cut off in order to shew clearly the arrangement of their growth on the stem. Here three coils are made, and eight leaves passed before one (the ninth) is found growing exactly above the first. Carrying the eye up, it will be observed that exactly the same order prevails in every series of eight leaves, the seventeenth and twenty-fifth standing in a direct line above the first, and beginning respectively a new series.

Here instead of the $\frac{2}{5}$ arrangement we have then the $\frac{3}{8}$; and the regular rhythm of coil and leaf is not 3, 2; 3, 2; as with the *Pittosporium* and the rose, but 3, 3, 2; 3, 3, 2; a simple enough little bird-note still.

These rhythms of the plant world are very fascinating to search out, but they are often by no means easy to discover, as they are masked by many circumstances. Sometimes there is suppression of certain leaf buds which throws out all the series; again there may be suppression of internodes between the leaves, and two leaves which would normally be separated by a space of stem may grow from the same joint in a pair. The common laurel when growing in its usual spreading way with its branches horizontally extended, has adopted the habit of arranging its leaves alternately so that the *third* leaf stands above the first, and the series appears to be completed in one coil passing through *two* leaves. This is very confusing; but if the investigation is pursued it is soon discovered that young sturdy shoots growing *perpendicularly*, have their leaves arranged all round the stem (instead of all facing one way on each side of it), and that now the *sixth* leaf is placed above the first, and the coil runs through three and two leaves alternately, shewing the $\frac{2}{5}$ arrangement. The reason for the other plan is obviously to obtain full sunshine and air for every leaf on the trailing horizontal branches. If they had kept to their normal manner of growth, certain leaves would have been pointing towards the earth. During the transition from one arrangement to the other, the placing of the leaves is often extremely confusing. This case serves as a good example of the ways in which leaf-arrangement may be modified by circumstances. It is interesting to remark here that upon the numbers which make up the series of leaves as arranged on the stem, depend the numbers of petals and sepals (or transformed leaves) in the flower. Thus the holly, with its sequence of eight leaves, has four sepals and four petals, four stamens and four divisions in its pistil; that is its flower is composed of two leaf-series compressed into four whorls of changed leaves—sepals, petals, stamens and pistil—for a new purpose. So the flowers of *Pittosporium undulatum* and of the rose have their parts in fives, corresponding with their leaf arrangement in a series of five. Here again, however, it must be remembered that circumstances often change and confuse the issue, and not in every case can the story be easily read.

If an effort be made to find the perfect series of phyllotaxian numbers in the diagram of the common holly, given above, the result will probably be puzzling. In order to do so it is necessary to break into the series of its leaf-arrangement and begin *at the end of the first coil.* Since the series runs: 3, 3, 2; 3, 3, 2; it will now read 3, 2; 3, 3, 2; 3, 3, 2; and so on; and the coil will pass three leaves in one turn, five in two turns, eight in three turns, thirteen in five turns, and twenty-one in eight turns ($\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, $\frac{8}{21}$).

Now the fircone is built on just the same general principles as these which I have been endeavouring to make clear; only in its case $\frac{8}{21}$ is the order of its leaves; that is the coil, if pulled out by the yard so as to shew its true formation, would be seen to pass through twenty-one scales in eight coils before one scale would be found growing exactly over the first, and the time of its rhythm is 3, 3, 2, 3, 3, 2, 3, 2; 3, 3, 2, 3, 3, 2, 3, 2; repeated endlessly as with the others.

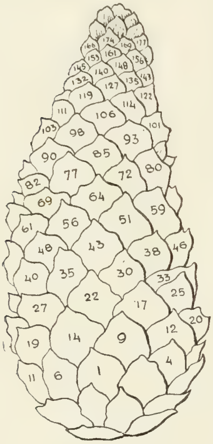

FIG. 3.

Shewing the manner of formation of secondary spirals on a spruce fircone having 8 spirals going to the right and 5 to the left.

Looking at the drawing of a fircone (fig. 3), with numbered scales, shewing the order of the hidden spiral which passes through them all, it will be seen that the twenty-second scale stands just above the first, and the compression of the cone is brought forcibly forward by that fact, for within that short space the original spiral has made no fewer than eight coils, passing through twenty-one scales in its way.

(*To be continued*).

GENERA AND SPECIES IN FUNGI.

M. C. COOKE, LL.D., M.A., A.L.S., V.M.H. etc.

SOME forty or fifty years ago there was a great outcry amongst botanists of heresy in the camp, and two factions raged against each other. These came to be called ‘ splitters ’ and ‘ lumpers.’ The former indulged in an inordinate increase in the number of species in flowering plants—the latter in the delimitation of species to the old lines. The chiefs in these camps were, for the ‘ splitters ’ (to a large extent, though not to the full of the fanatics) Professor C. C. Babington, and for the ‘ lumpers ’ Dr. Joseph D. Hooker and George Bentham. If I remember rightly, the common Water Ranunculus was proposed to be divided into some ten or a dozen species, and an inconspicuous Crucifer into about sixteen species. In France, especially, the splitters went mad in their scheme of reform. Dr. Hooker, on his return from the Sikkim Himalayas, laughed at this fanaticism, and recommended the advocates to take a few journeys abroad, and examine the floras of other countries, and not attempt to legislate on the strength of their knowledge of local floras, and then they would discover how one species dissolved into another, and how absurd it was to characterize *individuals*, and convert them into species.

This is the head and front of my offending, that I recognize *genera* and *species* as purely artificial groups, constituted by human authorities for the purposes of classification, but that really there are no such things in nature ; and in justification of this view, I affirm that it may be discovered that in all genera there are abnormal forms, or intermediate links which do not belong strictly to any genus, but are intermediate, or ‘ missing links ’ which join one genus to another, and combine them into one continuous harmonious whole, gliding the one into the other without a gap between, and thus the whole scheme of vegetation is a unity—or, as Dr. Christopher Dresser has intimated, is ‘ Unity in Variety.’

In Lindley's ‘ Vegetable Kingdom,’ in nearly every natural order, a scheme of affinity is given as in *Malvaceæ*—

Geraniaceæ
Sterculiaceœ —*Malvaceæ* —Byttneriaceæ
Chlænaceæ

showing how Malvaceæ is linked with four other natural orders. And the same process might be adopted for all *Genera* and, indeed, for all species. And if this doctrine is true as regards natural orders, why is it not true of families, genera and species? Indeed, it may fairly be presumed that if it is true in the one case, it is in the others. I am often deeply grieved that these views did not present themselves to me many years ago, when I had so many facilities for discovering ' missing links ' all over the world, which could not occur within the limits of a local flora.

In the present instance I am only concerned to apply this hypothesis to a single group of Fungi, and that the Hymenomycetes, although I do not doubt in the least of its being applicable all round.

My illustrations will consequently be confined to this single group, which will be sufficient to illustrate my theory.

Of course, as no one's attention has been called to observation in this direction, the illustrations collected will necessarily be few, but they may be largely increased when other observers take to the field. For instance, *Calocera*, with the habit of Clavaria and the fructification of *Tremella*, is a missing link, and may be included in Clavariaceæ or in Tremellaceæ without being a good member of either, and may be included in either order with equal justice, according to the will of the author, since it unites the two orders without belonging to either.

Again, *Tremellodon* has the external features of Hydnum, but the fruit of Tremella, so that again it is an anomaly in the Hydnaceæ as well as Tremellaceæ, and we may write it thus :—

Hydnaceæ — *Tremellaceæ* — Clavariaceæ

So again if we revert to the Clavariaceæ we shall find that the exotic genus *Lachnocladium*, which is usually included in the Thelephoraceæ, has the habit and appearance of a Clavaria with the texture and spores of Thelephora, and was included by Fries in Thelephoraceæ, but by Saccardo in Clavariaceæ, and may be stated thus :—

Thelephoraceæ — *Clavariaceæ* — Tremellaceæ

In Thelephoraceæ the entire genus of Cyphella has the habit and appearance of Peziza, but the structure of the Thelephoraceæ, and, even in some cases, the fructification when quite mature, passes into that of the Discomycetes, so that the genus is a ' missing link ' between the Hymenomycetes and the Discomycetes.

Clavariaceæ — *Thelephoraceæ* — Discomycetes

Again in the Tremellaceæ are such species as *Tremella sarcoides* of Fries which, when fully developed, becomes *Ombrophila sarcoides* with the ascigerous fruit of the Discomycetes, but in the young state, and when undeveloped is only an abnormal Tremella, and is really the link between Tremella and Bulgaria.

In the Dacryomycetaceæ is to be found the little yellow Peziza shaped *Dacryomyces chrysocomus*, which finally is discovered to merge into the genus Calloria, and thus form the link between Dacryomyces and Pezizaceæ.

These examples might be multiplied for all the families of the Hymenomycetes. For instance there is an exotic form of *Dædalea quercina*, which I pointed out to the late Rev. M. J. Berkeley, and with which he agreed that in all essentials it was a *Lenzites*, and thus linked *Dædalea* (Polyporaceæ) with *Lenzites* (Agaricaceæ) although neither a good *Dædalea* nor a good *Lenzites*.

Moreover, there are two or three species of Foreign *Lenzites* which are admitted to be abnormal, and link that genus with *Trametes* (Polyporaceæ) and thus the Agaricaceæ glide imperceptibly into the Polyporaceæ.

We might also indicate in Gasteromycetes a genus *Gyrophragmium*, consisting of a single species, native of Algeria, which forms so close a link with *Coprinus* and *Montagnites* (both of which belong to Agaricaceæ) that it has been called *Montagnites Dunalii*, and also *Agaricus ocreatus*, but it is the link between the Hymenomycetes and the Gasteromycetes, combining features of both natural orders, joining them through *Secotium* and *Polyplocium*, all of which are genera unknown to our local flora.

And now perhaps I may indicate some of those which I consider as ‘ links ’ between different *genera*, which are perhaps even more numerous than those between ‘ families ’ and ‘ natural orders.’

Any one who is acquainted with *Clitocybe* will remember that there is a section called ‘ Difformes.’ Now, it is a patent fact that many of the species in this section approximate so closely to *Tricholoma* that many persons consider it equally entitled to a place as a section of *Tricholoma* to that of *Clitocybe*, and one or two of these species might be selected as veritable links between Tricholoma and Clitocybe.

Then again, there is the species called by Fries *Pleurotus decorus*, but which has recently been placed in Tricholoma, as more fitting, but which is neither a good Pleurotus nor a good Tricholoma, but which is a good link between the two.

Lepiota lenticularis is again so abnormal a species of Lepiota that some authors have ventured to transfer it to *Amanita*, where it is equally out of place, and it appears to me that it is one of the links between *Lepiota* and *Amanita*, of which I recognize two or three others.

Schulzeria is simply Lepiota without a ring, as *Amanitopsis* is *Amanita* without a ring, and but little imagination is necessary to discover connecting links between the ringed and ringless forms.

If we leap to *Mycena* we shall have no great difficulty in discovering links with Collybia such as *Collybia psathyroides*, which again suggests a barren Psathyra, but beyond this we have links between *Collybia* and *Marasmius*, which are indisputable. Doubtless the original *Collybia cohærens* is better placed in *Marasmius*, but, are not one or two others, if not veritable species of *Marasmius*, at least strong links between the two genera, such as *Coll. stipitaria*.

Then again, such genera as *Amanitopsis*, *Schulzeria*, and *Pilosace*, which only differ from *Amanita*, *Lepiota*, and *Psalliota* by the absence of a ring, and are virtually ' links ' rather than genera in themselves.

We cannot fail to observe that *Psalliota cretacea* (Fries) is not by any means a good species, but such as has been termed an ' abnormal ' species, and has been attributed to *Lepiota*, to which it is probably the *link* between that genus and *Psalliota*.

Nor can we forget that several species of smooth spored *Inocybe* are scarce distinguishable from *Cortinarius*. There are one or two species of *Psathyrella* which are manifestly links with *Coprinus*.

The old species *Clitocybe gigantea* (Sow) is now generally recognized as *Paxillus giganteus*, although it is by no means a good species of *Paxillus*, and, to my mind, it is doubtful whether it should be regarded as *Paxillus* at all, but as a ' link ' between *Clitocybe* and *Paxillus*.

(*To be continued*).

YORKSHIRE NATURALISTS AT CAWTHORNE.

Cawthorne, on the outskirts of Barnsley, with its pit shafts and waste heaps, was the rendezvous of the members of the Yorkshire Naturalists' Union on Saturday, August 28th. Notwithstanding the artificial excrescences on the landscape, the district contains much that appeals to the naturalist.

Under the guidance of the Rev. C. T. Pratt and Mr. W. Hemingway, the geologists secured, from the shale heaps, beautiful club-mosses and ferns, so well preserved, that even their most minute structures could be examined. Some new and undescribed forms were obtained. Other sections were under the guidance of Dr. Fryer and Mr. A. Whitaker, and were fortunate in adding new species of coleoptera, mollusca, etc., to the local lists.

After tea a general meeting was held in the rooms of the Barnsley Naturalists' Society, under the presidency of Mr. G. T. Porritt, F.L.S. At this, reports of the day's proceedings were given by Messrs. Whitaker, Broadhead, Cheetham, Hutton, Morley, Lee, and Sheppard. There were representatives from twenty affiliated societies present.

Mr. P. Fox Lee writes :—'The botanists mustered in force and thoroughly enjoyed the pleasant walk, although there was but little of special rarity in flowering plants noted. The flora is a typical Coal Measures one, but in such delightful country, there must surely be in existence many other good species than seem to have been already recorded.

The best finds of the day in Cannon Hall Park and Deffer Wood were *Capnoides* (*Corydalis*) *claviculata* Druce, *Myriophyllum* (sp. ? one of the Water Milfoils, not in flower), *Hydrocotyle vulgaris* L., Agrimony, and *Scirpus setaceus* L. The lake in the Park was quite gay with the blossoms of the yellow water lily and *Sparganium simplex* Huds., with *Nitella opaca* Ag., also in the extensive grounds the Weymouth and Austrian pines with *Picea glauca* (bearing fine 9-inch cones) were flourishing, in the company of huge British timber trees.

Near the old disused canal on the way to Barnsley was a grand display of the tall, erect racemes of *Verbascum Thapsus* L., the great Mullein.

Coleoptera.—Mr. E. G. Bayford writes :—'Notwithstanding the beautiful weather, beetles did not appear to be particularly numerous. The following species, mostly common ones, were met with. No doubt more would have been discovered had not the route been too lengthy for much settled work.

Notiophilus biguttatus F.
Nebria brevicollis F.
Pterostichus vulgaris L.
,, *striola* F.
Anchomenus angusticollis F.
,, *parumpunctatus* F.
Bembidium mannerheimi Sahl.
Dromius quadrimaculatus L.
Anacaena globulus Payk.
Megasternum boletophagum Marsh.
Tachinus flavipes F.
Tachyporus chrysomelinus L.
,, *hypnorum* F.
Platystethus arenarius Fourc.
Anthobium ophthalmicum Payk.
Choleva fusca Panz.
Coccinella decempunctata L.
Epuraea aestiva L.
Antherophagus nigricornis F.
Sinodendron cylindricum L.
Agriotes obscurus L.
Phyllodecta vitellinae L.

HYMENOPTERA.—In this order the most noticeable and at the same time the most abundant species was without doubt the common wasp (*Vespa vulgaris* L.). An arm of a large tree in Cannon Hall Park, from which the extreme end had been broken, had been utilised for nesting purposes. The whole of the branch, some twelve feet in length, and part of the trunk itself, were fully occupied, and presented a scene of admirable activity. Wherever a little water had been collected in the numerous depressions in the clayey soil, and on the large umbels of the Angelica and Cow Parsley, which in Deffer Wood were fine and extremely abundant, wasps were present in numbers. Since 1893 I have not seen so many in one day's outing. At the same time wasps do not appear to be specially plentiful elsewhere in the Barnsley district. Bombi were also much in evidence, and a specimen of *Odynerus parietum* was observed.

ARACHNIDA.—Mr. Wm. Falconer reports that Mr. W. P. Winter and himself, the only members of the party interested in the Arachnida, found the route followed a most excellent one, leading as it did through an ideal woodland district. Spider-collecting, however, requires much closer application over a more restricted area than they were able to give, owing to the distance traversed, so that only a very imperfect investigation was possible. Search was practically confined to the first portion of the route, time not permitting any work to be done in the Cawthorn Park Wood. Beside the ponds in Cannon Park, *Lycosa amentata* Clerck and two species of *Œdothorax* (*Gongylidium*) *fuscus* Bl. and *retusus* Westr. swarmed, and from beneath the rugged bark of the adjacent sycamore trees, one male *Epeira umbratica* Clerck (new to the West Riding), many examples of *Segestria senoculata* Linn., *Amaurobius fenestralis* Stroem, and a few *Styloctetor penicillatus* Westr. and *Clubiona* *corticalis* Walck. were obtained. For the last two there are only two other Yorkshire records. From the yews growing by the side of the drive leading into Deffer Wood were beaten a few immature specimens of both sexes of *Epeira sturmii* Hahn. This is the first definite Yorkshire record of this spider. In the wood itself, a wet spot yielded *Bathyphantes approximatus* Camb., one female (new to West Riding) ; the bracken debris produced *Œdothorax agrestis* Bl., *Tapinocyba pallens* Camb. and *Wideria cucullata* C. L. Koch ; and on tree trunks *Drapetisca socialis* Sund. abounded. The best finds of the day however, were an adult pair of *Ceratinella scabrosa* Camb., and a female *Walckenaera*, which has not yet been determined satisfactorily, both new to Yorkshire. Altogether, forty-three species of true spiders, five of harvestmen, and one of pseudoscorpions were met with. In the following complete list, A denotes species obtained by both, B by Mr. Winter only, and C by himself only.

A. *Segestria senoculata* Linn.
Clubiona corticalis Walck.
Amaurobius fenestralis Stroem.
Drapetisca socialis Sund.
Linyphia triangularis Clerck.
Leptyphantes blackwallii Kulcz.
Bathyphantes variegatus Bl.
Microneta viaria Bl.
Œdothorax fuscus Bl.
Œd. retusus Westr.
Dicymbium nigrum Bl.
Styloctetor penicillatus Westr.
Cornicularia cuspidata Bl.
Pachygnatha degeerii Sund.
P. clerckii Sund.
Meta segmentata Clerck.
Xysticus cristatus Clerck.
Lycosa amentata Clerck.
L. lugubris Walck.
Oligolophus morio Fabr.
O. agrestis Meade
O. palpinalis Herbst.
Obisium muscorum Leach.
B. *Clubiona reclusa* Camb.
C. comta C. L. Koch.
Stemonyphantes lineata Linn.
Diplocephalus fuscipes Bl.
Bolyphantes luteolus Bl.
B. *Epeira umbratica* Clerck. (new to W. Riding).
Neon reticulatus Bl.
C. *Labulla thoracica* Wid.
Leptyphantes terricola C. L. Koch.
Bathyphantes approximata Camb. (new to W. Riding).
B. gracilis Bl.
B. concolor Wid.
Microneta beata Camb.
Sintula diluta Camb.
Œdothorax agrestis Bl.
Lophomma herbigradum Bl.
Diplocephalus picinus Bl.
Tapinocyba pallens Camb.
Walckenaera ♀(? species) (new to Yorkshire).
Wideria cucullata C. L. Koch.
Ceratinella scabrosa Camb. (new to Yorkshire).
Epeira sturmii Hahn.
Pirata piraticus Clerck.
Epiblemum scenicum Clerck (Walls of Cawthorn Museum).
Oligolophus tridens C. L. Koch.
Nemastoma lugubre O. F. Mull.

CONCHOLOGY.—Mr. J. E. Crowther writes :—'This section was officially represented by its President, Mr. W. Harrison Hutton, Messrs. Rushwath and J. E. and T. Crowther. Alighting at Darton station, and proceeeding in the direction of Barugh Bridge several species were found on the roadside, including *Arion intermedius* several species of *Vitria, Hygromia hispida, Helix hortensis* and *Clausila bidentata.* In the canal at Barugh several fresh-water species were noted, including *Limnaea stagnalis, L. auricularia, Planorbis carinatus P. contortus, Valvata piscinalis, Bithynia tentaculata* and *Paludestrina jenkinsi.* In a pond near Cawthorne were *Planorbis albus,* with *Pisidium pusillum* and its var. *grandis.*

In the Lake at Cannon Hall Park dead shells of *Limnaea auricularia, L. pereger, Anodonta cygnaea* and *Unio pictorum* were found ; in one of these a crayfish had made its home.

Deffer and Cawthorne Park Woods proved rather unproductive. *Euconulus fulvus* and *Vitria crystallina* in the former, and *Arion subfuscus* in the latter were all that were noted. On the roadside near Kexbro *Helix hortensis* was found in some variety, *lilacina* being the most notable. The dryness of the weather in some degree accounted for the shortness of the list of land shells. *Paludestrina jenkinsi* was first found by the writer on May 22nd of this year when some members of the section paid a visit to the district. This species was first discovered at Plumstead in 1889 by Mr. A. J. Jenkins, and has since been found in many parts of this country, sometimes (as in the present instance) in incredible numbers. How it is that it suddenly appears in such numbers and in such widely distinct places is one of the problems that has not yet been satisfactorily solved. One suggestion is that it is introduced in timber from the Baltic, which may be very likely in this instance as large numbers of pit props must be imported into the district every year, though this particular part of the canal has not, I believe, been used for traffic for over twenty years, and it seems unlikely to have been overlooked by such energetic conchologists as Wilcox, Hebden and Whitwam, who must have worked the district many times.

Another suggestion is that this species has cycles of abundance, sometimes appearing in large numbers in one year and then in gradually decreasing numbers (as in the Spen Valley instance), till conditions favourable for another revival occur, and that many of the older conchologists either overlooked them altogether, or mistook them for the young of larger species.

The following is a complete list of the mollusca noted during the excursion :—

Limax maximus
Agriolimax agrestis
Milax sowerbyi
Vitrina pellucida
Vitria crystallinus
,, *cellaria*
,, *allaria*
,, *nitidula*
,, *pura*
Euconulus fulvus
Arion ater
,, *subfucus*
,, *intermedius*
,, *hortensis*
Pyramidula rotundata
Hygromia hispida
,, *rufescens*
Helix hortensis
Cochlicopa lubrica
Clausilia bidentata
Limnaea auricularia
,, *pereger*
,, *stagnalis*
Planorbis albus
,, *carinatus*
,, *contortus*
Physa fontinalis
Paludestrina jenkinsi
Bythinia tentaculata
Valvata piscinalis
Unio pictorum
Anodonta cygnaea
Spherium corneum
,, *lacustre*
Pisidium amnicum
,, *pusillum*

Mr. W. Harrison Hutton writes that he found a typical half-grown specimen of *Milax sowerbyi* near the museum at Cawthorne. It was about two inches down, amongst the roots of vegetation—a quite characteristic habitat. T. S.

HISTORY AND TOPOGRAPHY.

Liverpool Castle and its Builders, by **C. H. Hand.** Liverpool : Hand & Co. 37 pp., 2/6 net.

Having regard to its apparent size, it is astonishing with what rapidity one can read through this little book. But it is printed on one side of thick paper only, in large type, and has a wealth of margin. Still it is none the worse for that, and as it is fortunately lettered on the back (a rare feature in thin books now-a-days) it can be at once detected on the bookshelf. Mr. Hind gives an entertaining account of the vicissitudes of the Castle from the time of King John, points out its present site in Liverpool, gives an illustration of the last remnant of the Castle, and refers to the confusion which has taken place in the past between the 'Castle' and 'Manor House.' He also draws attention to an error in the pageant of 1907—a not very difficult matter, unfortunately!

York in English History, by **J. L. Brockbank** and **W. M. Holmes.** London : A. Brown & Sons. 292 pp.

The publishers of this work have been fortunate in issuing it at a time when York is so prominently before the public. Though much has been written about our northern capital, we must say after a careful perusal, that the present volume is as refreshing to read and as well and accurately written as any that have appeared in recent years. The authors have traced the history of the place from pre-historic times ; and have taken full advantage of the unrivalled series of episodes that have there occurred. *Inter alia* it is interesting to find how helpful is a local museum in illustrating the history of its district ; the specimens now in the York Museum, which are figured, being of great value in this connection. A quite unusual feature in the volume is the way in which the chapters are sub-divided into paragraphs, each averaging half a page in length, the contents being indicated in clarendon type. In this way the interest is kept up, and reference can be made to any particular point at a glance. We don't believe the 'Celt and his Coracle,' or the River Ouse, ever looked like the representation on page 8, not even in the 'Times of Eburach' Having been printed at the Savile Press, the typography, of course, is all that can be desired.

FIELD NOTES.

BIRDS.

Green Sandpiper and Dunlin at Thirsk.—Mr. R. Lee informs me that a green Sandpiper was obtained at Thirsk about September 17th. A little girl picked up a Dunlin which was running about the road with a broken wing, evidently damaged by flying against the telegraph wire. It died the following day.—R. FORTUNE.

Bird Notes from Scarborough.—A pair of Pied Flycatchers has each summer for the last three years built its nest, and reared its young in the same tree at Langdale End. Dippers have successfully hatched out a brood on the Scalby Beck, within one hundred and fifty yards of the open sea.—STANLEY CROOK, Scarborough.

Dotterel near Boroughbridge.—Dr. Steward informs me that when shooting to-day (October 9th) near Boroughbridge, a Dotterel was obtained by one of the party. The plumage was in a transitory condition between summer and winter. The locality and the time of year make the event worth recording.—R. FORTUNE.

The Crossbill Migration.—During the month of July, the Crossbill visited the Whitby district in considerable numbers. At Carr Mount Gardens, about three miles from Whitby, about forty were seen on the 10th, and one was picked up dead under some telephone wires, which had probably been the cause of its death. On the 14th, another was found in a dying state, near Whitby, and about the 19th a third was shot out of a flock of a dozen or so, which for a few days frequented a large garden on the outskirts of the town. All three were females or young birds.—THOS. STEPHENSON, Whitby, October 11th, 1909.

Late Nesting of the Barn Owl.—At Plumpton, near Harrogate, a pair of Barn Owls had young in the nest on September 17th. They left the nest or were taken between that date and the 19th. The curious fact in connection with these birds is that it is their invariable practice to hatch their young either at the latter end of August or the beginning of September. Dr. Steward and myself have had them under observation for some years. They usually nest in the same tree, but occasionally frequent another one near at hand. No attempt is made at nesting during what may be considered the regular months, so that the brood is not a second one, as anyone finding them so late might be led to believe. Whatever the cause may be which leads them to defer nesting operations until so late in the season, it certainly cannot be scarcity of food, as the estate upon which they nest certainly furnishes ample, both furred and feathered.—R. FORTUNE.

—: o :—

LEPIDOPTERA.

Yorkshire Micro-Lepidoptera.—Mr. Francis Buckley, of Greenfield, and his brother, who have worked the Micro-lepidoptera of their district assiduously for several seasons, some time ago brought me a number of specimens for examination, and afterwards sent me a full list of their captures. As these include some very interesting species for Yorkshire, it is time they were placed on record.

Amphysa walkerana :—Common.

Peronea comariana—Only recorded previously from Bramham and Kildale in the county.

Phlæodes tetraquetrana—A quite black form of this common species occurs frequently.

Euchromia mygindana—' Quite common.'

Pamplusia monticolana—' Common.'

Coccyx cosmophorana—' Common among small firs at Greenfield.' Previously only known as a Yorkshire species from two specimens taken on Skipwith Common, by the Rev. C. D. Ash, in 1903.

Coccyx ustomaculana—Abundant.

Pyrodes rhediana—New to South West Yorkshire.

Ochsenheimeria bisontella—Abundant ; previously only recorded from Huddersfield.

Solenobia inconspicuella—Greenfield.

Lithocolletis vacciniella.

Mr. Buckley also told me that the black form of *Fidonia atomaria* is of common occurrence on the Greenfield moors.—GEO. T. PORRITT, Huddersfield, October 12th, 1909.

◆

In the Scientific Proceedings of the Royal Dublin Society, Mr. M. A. C. Hinton has a valuable paper ' On the Fossil Hare of the Ossiferous Fissures of Ightham, Kent, and on the recent hares of the *Lepus variabilis* group.' This is illustrated by views of the skulls, etc., and there are numerous elaborate tables of measurements of bones.

NEWS FROM THE MAGAZINES.

Mr. R. Standen writes ‘ Notes on the Cave Spider—*Meta merandi* in *The Lancashire Naturalist* for September.

Mr. A. H. Patterson contributes some fascinating ‘ Rough Notes on the Fish and Fisheries of East Suffolk ’ to the October *Zoologist.*

A valuable paper on ‘ The Insect and Allied Pests of the Hop ’ appears in *The Journal of the Board of Agricultural* for October.

Mr. J. Wilson has a thoughtful paper on ‘ The Scandinavian Origin of the Hornless Cattle of the British Isles ’ in *The Scientific Proceedings of the Royal Dublin Society* (N.S. Vol. XII., No. 15, 1909). It has some notes on old Yorkshire, Durham, etc., breeds.

There is an interesting article on ‘ The Genus *Chermes* in its relation to Forestry,’ by Dr. R. S. MacDougall, in the *Journal of the Board of Agriculture* for September. This principally refers to the disease of the larch tree, which seems to be extending in recent years, and it gives a life history of the aphis.

We learn from *The Quarry* that the steady demand for Whitby jet goods which has taken place recently looks like bringing about a revival of this industry. The stocks of raw material having been almost used up, arrangements have been made for the re-opening of the mines between Staithes and Rosedale.

The *Hull Literary Club Magazine* (Vol. III. part 5), besides containing reports of the various papers read at the club's meetings, contains the President's address on ‘ The Evolution of an English City ’ [Hull], and ‘ Friends from My Bookcase,’ by Alderman Brown, in which many local books and MSS. are described in detail.

With the October number of the old-established *Geological Magazine*, the Editor appeals for further support to secure that the journal may be continued. In order that it may be on a business footing in future, it will be necessary to increase the price to 2/- per month, and from fifty to one hundred additional subscribers must be obtained.

We are glad to see that *The Country Home* has been considerably enlarged and improved, without an increase in the price. With the October issue the publishers, The Sphere and Tatler Ltd., have produced a most desirable magazine for all lovers of the country, at the small price of 6d. The articles deal with gardening, nature study, old English homes, china, pets, greenhouses, etc., and the illustrations are as beautiful as they are numerous.

Christ's College Magazine, No. 70 (Cambridge University Press), is a ‘ Darwin Centenary Number,’ and contains much interesting matter relating to our greatest naturalist, including some letters hitherto unpublished. Mr. T. E. Pickering writes on ‘ Darwin's Shrewsbury Days ’ ; Mr. A. E. Shipley, on ‘ Charles Darwin at the Universities, Edinburgh—Cambridge ’ ; The Master of Christ's College on ‘ Christ's College in the years preceding the entry of Charles Darwin ’ ; ‘ Darwin and the Linnean Society,’ by Dr. B. Daydon Jackson ; ‘ Letters from Charles Darwin to Alfred Russel Wallace ’ with notes by Mr. Francis Darwin ; ‘ Present-day Darwinism,’ by L. Doncaster ; ‘ Darwin's “ Animals and Plants ”,’ by Mr. F. H. A. Marshall ; and ‘ Plants named after Darwin,’ by Dr. B. Daydon Jackson. As a frontispiece is an excellent view of the room occupied by Charles Darwin at Christ's College, of which all ‘ Christians ’ at Cambridge are justly proud.

2 NOV. 1909

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THE MUSEUM, HULL;
AND
T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

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NOTES AND COMMENTS.

THE LATE DR. W. H. DALLINGER, F.R.S.

We regret to record the death of Dr. Dallinger, which took place at Lee, Kent, on November 8th, at the age of 67. Dr. Dallinger was well-known as a biologist and microscopist ; but perhaps appealed to the widest circle as a popular lecturer. He was born at Devonport in 1841, and entered the Wesleyan ministry in 1861. His first scientific researches dealt with the life history of putrefactive organisms. In connection with this work he received a grant of £100 from the Royal Society ; and was elected F.R.S. in 1880. Three years later he was elected President of the Royal Microscopical Society, and he also occupied the presidential chair of the Yorkshire Naturalists' Union. His work with the microscope continued to occupy much of his time until his death. In 1891 he brought out a revised edition of Carpenter's Text Book on the Microscope. On the occasion of the British Association meeting at Montreal, he was elected LL.D. of the Victoria University at that place ; and the degree of D.Sc. was conferred upon him by Trinity College, Dublin, in 1891.

A CLIMBING SNAPDRAGON.

In the October number of the 'New Phytologist' (pp. 284-298), an interesting sport of the Common Snapdragon (*Antirrhinum majus*) is described by Dr. T. W. Woodhead and Miss M. M. Brierley. This form appeared in the garden of Mr. H. G. Brierley, at Brimscar, Huddersfield, in the summer of 1908. During this windy season some thirty individuals of the white variety showed a strong tendency to climb ; many of their lateral branches were transformed into tendrils, which developed right and left-banded spirals in various positions on the branches, while others twined in a manner similar to that of the Convolvulus. A second season's plants grown from cuttings, as well as a second generation grown from seed, showed this tendency to persist, some of this year's specimens having as many as sixty-six branches on one plant, showing the climbing habit. Many of the branches developed coils in such positions as to be quite useless for clinging to a support, but others completely encircled neighbouring branches, and thus possessed all the advantages of a typical climber. The microscopic structure of the climbing branches was examined, and showed all the histological modifications characteristic of climbing plants in which the habit has long been hereditary. The paper is illustrated by three plates and numerous text figures showing these remarkable modifications.

THE BIELSBECK DEPOSIT.

The final report of the Committee for the investigation of the Fossiliferous Drift Deposits at Kirmington, Lincolnshire; and at various localities in the East Riding of Yorkshire, was presented at the Winnipeg Meeting of the British Association. It dealt with excavations made by the Committee at Bielsbeck, a plan and sections of which are given, together with a list of the bones of *Elephas primigenius* and *Bison priscus* which were secured.

MIGRATION OF TERNS, ETC.

During the year large numbers of young birds have been marked by having rings fixed on their legs. The rings supplied by "Country Life' and 'British Birds' have distinctive numbers, so that wherever or whenever the bird turns up, it will be easy to find out where it was originally hatched. Mr. R. Fortune writes to us, pointing out that many interesting facts relating to the movements of birds are sure to be brought to light, through the endeavours of ornithologists all over the kingdom. In connection with the movement in the North of England, the following facts have come to light. An Arctic Tern, which was ringed by Mr. Fortune on the Farne Islands on July 17th, was obtained at the Barnes Ness Lighthouse, near Dunbar, on August 23rd, and 'British Birds' reports that a Sandwich Tern, ringed at Ravenglass, on June 30th, was recovered at Silloth on August 20th. In both these cases it is interesting to note that the birds were thirty to forty miles *north* of their breeding places, at a time when we should be expecting them more southwards. An interesting record also from 'British Birds' is that of a Black-Headed Gull, which was ringed at Ravenglass, on the West Coast, on June 20th, and was shot at Middlesborough, on the East Coast, on September 18th.

◆

Country Life for October 16th, contains an interesting article, illustrated by some remarkable photographs, upon the breeding of the Dormouse in the North Riding of Yorkshire, by Mr. Oxley Grabham.

THE DISAPPEARANCE OF THE PLAICE.

PROF. W. GARSTANG, M.A.. D.SC.

IN 1875 the plaice caught in the North Sea was 549 cwts., and in 1892 it was 168 cwts.; in the same period haddock dropped from 837 cwts. to 436 cwts., prime fish from 63 cwts. to 29 cwts., and rough fish increased from 30 to 49 cwts., and the total was 1565 cwts. in 1875 as against 638 cwts. in 1892. In 1867 the total was 2012 cwts. Official statistics since 1892 told very much the same tale.

One of the methods of tracing the migration of the fish in the North Sea is by means of labels or tallies, and inducing to the fishermen to return them, and then mapping them out. Plaice marked and put into the sea between the Thames and Belgium, that is in the southern part of the North Sea, in the Spring, migrate northward, travelling great distances. Fish marked and placed in the sea off the Danish coast make out towards the open as the summer advances, and partly return in the following winter. The summary of these and other experiments shows that the fish tend seawards and northwards in the summer time. Fish marked and placed in the water in the north of the North Sea, are practically caught in the south in the winter months, but found to be returning northwards in the summer. These fish are apparently coming to spawn, and it was a curious fact that in the first year of these experiments all the fish caught coming south were males. Later, when the females were found coming south, the females were of a larger size. As a matter of fact, the fish put in in the first year had been rather a small lot, and the male plaice spawned when smaller than the female. All the fish migrating to the south in the winter time were mature fish, and the reason we had no females in the first year of the experiment was that the females caught and marked had not reached maturity. Plaice spawned from January to March, but chiefly in February, and to prove whether the southern part of the North Sea really was the spawning ground of the plaice, a special net was made for dredging up the minute eggs of the plaice, and dredgings made all over the North Sea proved the truth of the theory; the eggs were in far greater numbers in the southern part of the sea than in the northern part.

If one looks at the section of the backbone of any fish, he

1909 Dec. 1.

will find a number of rings or marks. The age of the fish can be determined by counting these rings. But inside the heads of many fish is a little bone of a flattened or oval shape, called the ear bone or the otolith. It is not strictly the ear bone, but a little nodule inside the hearing organ, helping in some mysterious way to enable the fish to appreciate vibrations in the surrounding waters. These bones have first an inner white disc, then a dark ring, and next a light ring, and so on white and dark rings alternately. A large number of 6-inch fish was caught, and in the otolith of nearly all of these there were two light and two dark rings. The light rings correspond to the summer growth, and the dark rings to the winter growth. Plaice grew about two inches each year, and one 17 inches long, proved to be seven years and seven months old. The females grow faster than the males. At eight years the female is over eighteen inches, whilst the male is less than fifteen inches. This is probably due to the fact that the males spawn a year earlier than the female, and so stunt their growth. The ordinary sizes of plaice are at three years, eight inches, and at five years, twelve inches.

In the southern waters the percentage of males which are mature are: at three years, 20 per cent.; at four years, 60 per cent.; five years, 90 per cent.; six and seven years, 100 per cent. There are scarcely any females in the southern grounds mature at four years, and not more than half until they are six years. In the northern seas there is a year's difference in the time of spawning. Here the majority of the males are not mature until they are five or six years old, as against four years in the southern waters. In the females there is no majority of maturity until they are six years old, and then the large majority of them are mature.

A line drawn off the Continental coast encloses no fish but what are mostly less than eight inches in length. The next zone further out they are generally from eight inches to ten inches; in the next zone, ten inches to twelve inches; and in the next, including a part of the Dogger Bank, twelve to fourteen inches. Towards the north the plaice become larger and larger, on the west portion of the Fisherbank and in the Gut and northern part of the Dogger they are sixteen inches to eighteen inches, and still further north eighteen inches in length. As to age, inside the first zone—(*i.e.*, along the Danish and Dutch coast)—they are less than three years old; in the next zone they are two and three years, still further seaward, including the Lower Scruff and the Lowestoft Deep Water, they are three to four years, on the south part of the Dogger three to five years, further seaward on the north part of the Dogger, on the west of the great Fisherbank, four to five years, and then above the Gut four to six years old. The fish are in large numbers in the first zone, but as they move seawards and increase in size they also decrease in numbers. Experiments show that whereas 1000 fish twelve inches in length are secured in an hour's fishing on the east side of the North Sea, only 50 per hour are caught further out to sea. This was in the Spring of the year. From July to December the mass of fish had moved a little further from the coast into the sea.

Below eight inches the males exceed in number, above that size the males lose their preponderance, at fourteen inches they rapidly fall off, and over eighteen inches there are practically no males at all to be found.

The mass of White Sea plaice is found to be mature; the number of mature plaice there enormously exceeding the number of immature plaice, and they extend over a very great range of size. The average size at which the females become mature there is sixteen inches, so that the females begin to spawn at exactly the same size as in the North Sea. But on examining the otoliths of these sixteen-inch fish in the White Sea they are found to be very much older than the sixteen-inch North Sea fish, so that they grow very much more slowly. A White Sea female plaice begins to breed at the age of eleven or twelve years, whereas in the North Sea they begin at six years. The males begin to breed in the White Sea at eight or nine years of age. The plaice there are very considerable in number until they are twenty-two inches in length, and they are then not less than twenty years old. From these and similar facts, it might safely be inferred that on a virgin fishing ground, like the White Sea, the males continue to spawn in practically undiminished numbers for at least five years, and the females for at least eight years. In the North Sea there are practically no males over eight years, whereas the females occasionally grow to be twenty years old, but such are extremely scarce; they are twenty-four inches in length at least. The bulk of the fish found on the central grounds of the North Sea are immature.

Of 6147 fish caught and marked, and then liberated in the

North Sea, 1409 have been caught and returned within twelve months. In the years from 1903 to 1906 the recapture of the marked fish was, of the very small, 11 per cent. per annum; from eight to nine inches, 21 per cent.; ten to eleven inches, 33 per cent.; twelve inches, 35 per cent.; fourteen inches, 40 per cent.; larger fish, 24 per cent, or a percentage of 23 of all sizes. Now if the fishermen caught 40 per cent. of the fourteen-inch marked plaice within a year, it may be fairly estimated that they caught 40 per cent. of the unmarked fourteen-inch plaice. The trawling is evidently so intense that amongst the fish of a marketable size the fishermen are catching from 33 to 40 per cent. in one year. If 1000 female plaice were placed in the sea, say of eight or nine inches, and three years old, 20 per cent. would be caught in the first year, leaving 800 four year olds. The fishermen would catch 30 per cent of these in the following year, leaving 569 five year olds. At that age the female plaice begin to breed, but only in a very small proportion. One tenth (56) of these might be estimated as breeders. The fishermen caught 40 per cent., leaving 336, of which two-thirds (224) were breeders, and, after that time all would be mature. The result is that from the 1000 fish there would be only 728 breeding operations during the eight years following the onset of maturity, which means that only about three-quarters of the three year old stock would ever breed once at all. In the unfished sea out of a thousand plaice the total breeders, after allowing for depletion by natural enemies such as sharks, would be 4841 in the same number of years by the same table. The net result is more than interesting, and is of vital importance. The fishing in the North Sea under the present conditions gives only one breeder for every six or seven that would have been secured in the unfished primitive times. As a result of the intense fishing, the age of the spawners or the age of breeding is reduced. In the unfished area the average age that most fish start spawning is about eight years; in the North Sea now it is six years. This means that we are putting a premium upon early breeding, and again this is a matter for consideration whether we are not thereby lowering the stamina of plaice, and encouraging a race of small plaice. In the English Channel, where trawling is an old occupation, they begin to breed at a very early age; in the south of the North Sea they begin breeding a year later, and in the north of the North Sea a year later still, whilst in the White Sea which is virgin ground to the trawler, the plaice do not spawn until two years after the North Sea plaice. If fishermen only caught the twelve-inch and larger plaice, and left the small alone, they would still depend on one-sixth of the original stock.

The impoverishment of these fish should be stopped by Act of Parliament, but there are difficulties. If a size limit were enforced the trawlers would go elsewhere, the intensity of fishing would become even greater among the larger or breeding stock, and therefore whilst on one hand we saved the immature fish, with the other hand they destroyed the eggs from which these small fish were produced, by the catch of the spawn fish. In my opinion it is safer to destroy 20 per cent. of the smaller plaice than add to any extent to the destruction of the fish on which the production depends.

It has been found that if we transplant the small plaice from the inshore grounds to the Dogger Bank, they grow enormously quicker than those left on the eastern banks. On the Horn Reef an eight inch plaice grew one and a half inches in one summer; transplanted in the Dogger Bank it grew five inches in the same time. If we look at that from the point of view of weight, it will be seen that whilst the Horn Reef plaice had grown to six ounces, the transplanted one had grown to one pound. Some use might be made of this wonderful growing power of the fish on the Dogger Bank. An expenditure of £1000 would ultimately yield from £4000 to £5000, if spent on transplantation.

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The Earth: in relation to the Universe, seen and unseen, by **Polaris.** Part I., Book 2. Registered. Darlington: Bailey & Co, 1909. 86 pp. In this extraordinary book, the writer deals with an immense variety of subjects, freely quoting from all manner of publications usually to the extent of about half of each page. Amongst the references to quotations we find, quite close together, G. K. Chesterton, 'British Weekly,' 'The Naturalist,' Proverbs of Solomon, Romans, R. L. Stevenson, Psalms, Carlyle, etc., etc. The chapters are headed 'The Test of Truth'; 'Concentrations'; 'Of Water and of the Spirit'; 'The Golden Mean'; 'Individuality'; 'The Golden Rule'; 'Bdellium and the Onyx Stone'; 'The Powers that be'; 'The Real and Unreal'; and 'Havilah.' We have had this pamphlet on our desk some time, but regret we have not had opportunity to read it. Having noted its contents, we leave such of our readers as are interested to procure it themselves.

We have received the admirably illustrated **Report of the National Trust** for places of historic interest or natural beauty, which contains an account of an excellent year's work. Those who take an interest in the preservation of England's beauty spots, should get a copy of this publication. One will be gladly sent on application to the Secretary, at 25 Victoria Street, Westminster.

THE STUDY OF A FIRCONE.

Mrs. E. HUGHES GIBB.

(Continued from page 388).

The next thing to notice is the perfect orderliness with which the numbers arrange themselves ; thus if we ascend one of the spirals going to the right, we shall find that the number of every scale is eight more than that of the preceding one ; 1, 9, 17, etc. ; 6, 14, 22, 30, and so on. Following a left-hand spiral (these are less obvious in the drawing than they are in the real cone) each scale is in its number, five beyond that of the preceding one ; 1, 6, 11 ; 4, 9, 14, 19, and so on. Or if we choose to follow the steeper apparent spirals to the left which present themselves to us in this sketch, we shall still find a perfect sequence of numbers, with 13 between each : 9, 22, 35, 48, 61, etc. In fact, whichever way we travel, there is no haphazard along the road, but a bewildering orderliness which gives the impression that every pathway of figures has been prepared with superhuman ingenuity.

To discover the origin of this perfect numerical arrangement we must study the base of a straight, well-grown fircone (one from a spruce fir is much the best for the purpose). Holding it with the bottom towards us, it will be seen that a certain number of spirals start from the base and ascend to the right, whilst another set go to the left. Let us count each set.

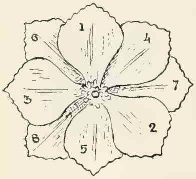

Fig. 4.

Showing the placing of the first 8 scales at the base of a fircone.

In the fircone sketched, eight spirals ascend to the right and five to the left, and this is the most usual arrangement, but it is reversed in some spruce and Scotch fir cones, and in larch cones there are three spirals going one way, and five the other.

Now if the lower scales are broken off for some little distance up the cone, it will be seen that no matter how thick or how thin the portion being stripped, there are always five scales in each whorl or round of the cone (see figure 4).

Three of these stand quite clear and free, and two are overlapped on one edge. Let us number the free ones 1, 2, and 3, and the overlapped ones 4 and 5. Three more scales, 6, 7 and 8, overlapped on both edges by members of the first five, peer out between 1 and 3, 4, and 2, and 5 and 3 respectively, and manage to shew a little strip of their base running to the centre of the cone. If we strip off 1, 2 and 3, the result will be that 4, 5 and 6 will be left clear, 7 and 8 will be overlapped on one edge only, and three new scales will peer between as did 6, 7 and 8. In short, the old order will instantly be restored with a general shift round; and we may continue to strip the cone with the same result (like turning a wheel) to the end.

Here again the phyllotaxian numbers are met in a new way. The *three* free scales, the *five* which form the whorl, the *eight* which complete the series of the secondary spirals—these are our old friends shewing themselves in the very heart of the cone. The ring of five scales which encircles the bottom of the cone is the starting point of the five secondary spirals running to the right or left, as the case may be. Each one of these five scales is the origin of a spiral, and it will now be easy to see how these coils are formed, and how we may correctly number each scale upon the cone. It is necessary here to make the preliminary remark that the object of the spiral arrangement of leaves being to secure as much light and air as possible for each, a corkscrew-like progression is not the plan adopted, and 2 will not be found next to 1 (as may easily be seen upon consulting the diagrams), the coil making a sweep of one-third around the stem before the second scale finds its place, a similar one before the third is placed, and then with two more sweeps dropping 4 between 1 and 2, and 5 between 2 and 3. When this first circle is finally disposed, the sixth scale is invariably placed next to 1, either on its right or left, according to which way the five secondary spirals are to proceed; 7 will be in the same position with regard to 2, and so on; and the five secondary spirals are started. Having marked one of the three free scales at the bottom as No. 1, we could now correctly number the whole cone without difficulty, so as to shew the course of the invisible central spiral. If the one chosen has eight spirals to the right and five to the left, the numbers of the first five scales *from left to right* will run 1, 4, 2, 5, 3; and following the spirals to the left which are started respectively by each of these, every scale must be marked with a number five in advance of the preceding one; 1, 6, 11, 16 and so on. If the cone has five spirals to the right and eight to the left, the numbers of the first five scales will be the same, only running *from right to left*, and the resulting spirals to the right will be numbered in the same way.

The eight secondary spirals running in the opposite direction have still to be accounted for, and if the diagrams shewing the manner of their origin are carefully studied, very little explanation will be necessary. In fig. 5 the double spokes represent the first five scales; the single ones mark the position of the next three, making the series of eight which starts the eight spirals running to the right, each of these eight scales, as will be seen, originating a spiral of its own in which every progressive member numbers eight more than its antecedent. The dotted spokes are to shew how every point of space around the stem is gradually filled as the general spiral proceeds, not one single scale being placed exactly over another till 21 have been arranged. The beautiful method displayed in the irregular placing of the first eight scales is clearly seen if diagrams Nos. 3 and 4 are compared. No. 3 shews how the first and fourth scale and the second and fifth cling together, leaving wider spaces between; No. 4 illustrates how cunningly these wider and narrower spaces have been calculated to accommodate the occupants designed to fill them, and how marvellously the whole plan works in a perfect order. Figs. 6 and 7 tell their own story, and hardly need comment or explanation.

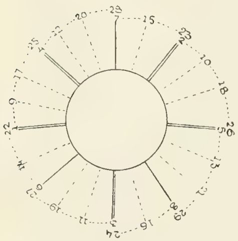

FIG. 5.

Showing the manner of formation of secondary spirals on a spruce fircone having 8 spirals going to the right and 5 to the left.

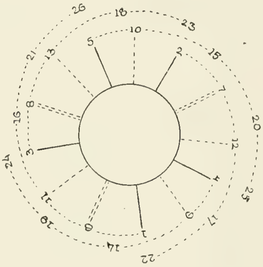

FIG. 6.

Showing the manner of formation of secondary spirals on a cone having 5 spirals to the right and 8 to the left.

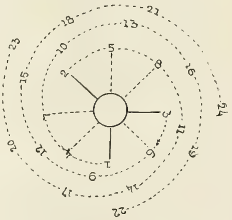

FIG. 7.

Shewing the manner of formation of secondary spirals in a larch cone having 3 spirals to the right and 5 to the left.

Anyone who has taken the trouble to follow carefully the details given in order to lay bare the hidden story of the fircone, must be impressed with the extraordinary amount of thought, ingenuity, accuracy and variety in unity which is compressed within this small space. The fircone, of all natural objects, appears to be the fittest symbol of Nature in her widest sense. It is the spiral and not the circle which is written upon the face of the Universe, and upon every particle therein. We ourselves in our ceaseless journey around the sun, are describing a spiral course, for the sun himself moves on—perhaps in some greater unknown spiral of his own.

The great central spiral upon which all things are strung is ever being sought but never to be found by mortal man. Darwin in his wonderful discovery of that great secondary spiral, Evolution, was ready to believe that he had come upon it, yet he came to recognise in the end that, great and almost inspired as his vision into origins was, it could not gather all into its mighty coil. That which can do so must of necessity extend so far above and beyond our little earth that it is futile for man to expect to read and decipher it in his present state of existence. The secondary spirals indeed often lie within our mental reach, and in the study of their origin we may perhaps learn to infer something of that wonderful rhythm which sings deep down in the heart of things, the rhythm of the coil and the leaf, of the upward movement and of life, the rhythm which, if we knew it, would make all things plain for us, and all things in harmony. This, at least, is the philosophy of the fircone.

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Palæontology. Invertebrate, by **Henry Woods, M.A.** Fourth Edition. Cambridge: the University Press. 1909, 388 pp.

The excellence and usefulness of this well-known handbook is proved by the fact that a fourth edition has been called for in a comparatively short time. Of its kind the book is the best. The numerous illustrations are largely drawn in order to give the student an idea of the principal features which require attention. A very helpful feature is the list of monographs dealing with the various sections dealt with.

History of the Geological Society of Glasgow, 1858-1908. Edited by **P. Macnair** and **F. Mort,** Glasgow, 303 pp.

This work has obviously been a labour of love on the part of the Editors, who are secretaries of the Society. Few provincial Societies can claim as many prominent scientific men as members as can the Glasgow Society, and its history is refreshing to read. A valuable feature is the biographical portion, in which notices of many well-known hammer-men, past and present, are given. The volume was issued to commemorate the Jubilee of the Society, and contains chapters on the fifty years' work under the heads of Physical and Dynamical Geology, Mineralogy and Petrology, Stratigraphical Geology, Palæontology, and Glacial Geology. There are many portraits, including those of Kelvin, John Young, H. W. Crossley, Dugald Bell, Sir Archibald Geikie, Prof. Lapworth, Dr. B. N. Peach and Dr. R. H. Traquair. We are sorry there is not one of Croll.

GENERA AND SPECIES IN FUNGI.

M. C. COOKE, LL.D., M.A., A.L.S., V.M.H. etc.

(*Continued from page 392*).

Not only does *Polystictus abietinus* and also *Poria vaporaria* sometimes assume the distinguishing features of *Irpex*, but also other species of the *Polyporei* normally pass into *Irpex*, and thus unite the *Polyporaceæ* with the *Hydnaceæ*. But if we quit genera and the larger groups, and direct attention to species themselves, the most indefatigable field hunters will be able to furnish many instances which have come under their own observation, in which allied species have exhibited so close an affinity that it has been difficult to decide to which species the abnormal forms actually belong.

Let any one examine at a foray a hundred specimens of *Amanita phalloides* and *Amanita mappa*, and I venture to predict that they will be able to show a complete series of gradations in which it would be impossible to determine where the one species ends and the other begins.

The larger the experience of the mycologist in field work the more ready will he be to acknowledge the many instances, which have presented themselves in which abnormal forms or 'missing links' have presented themselves, in which it seemed impossible to determine, with any certainty, to which of the two species the delinquent actually belonged. And it is these 'missing links' which constitute the gradation of species into species, and genus into genus, so as to combine and form a graduated series, sliding and melting the one into the other, and forming one continuous and harmonious whole.

It would be absurd to suppose that any one who is acquainted solely with a local flora could realize this transition, or recognise more than a very few of the 'missing links,' but the more his experience is expanded, the larger the number of these 'abnormal' species (as they have been called) will have come under his notice.

In the present notes I have confined myself almost entirely to British examples, whilst a large number of exotic examples have constantly floated through my memory to strengthen me in my hypothesis.

I find myself strengthened in this belief collaterally by remembering that Worthington G. Smith, some quarter of a century ago, advocated a view which would be practically identical, although in different terms, and applied chiefly to species.

This theory was, that having regard to varieties and 'abnormal' species, their origin must be traced to hybridization, and that most varieties, and many 'intermediary' species were hybrids. Of course the objection to this hypothesis was then as it is now, that sexual characters have not been discovered and defined in Hymenomycetal Fungi, and consequently, as hybrids are the result of sexual association, there could be no hybrids.

Still the ultimate conclusion was the same, that one species was linked to another naturally, and that the whole scheme of existence in the Agaricinæ was unity, and a graduated sliding scale in which one species glided imperceptibly into another through the intervention of varieties or abnormal species.

What also is the meaning of George Massee's application of the theory of evolution in 'The Evolution of Plant Life' and 'Phycomycetes and Ustilagineæ,' except that during past ages, as well as the present, one form has been developed from another, and that in plant life the parts glide imperceptibly the one into the other, and constitute an unbroken chain of organisms which we recognise as the 'vegetable world.'

Thus, then, we observe that it is no new theory that one form, or so-called species, merges into another by links, which are now sometimes obscure or missing, but which unite, not only all the members of one natural order with another, but also the larger groups such as the Fungi with the Algæ, and other of the Cryptogamia, although we may have to travel back thousands of years to realize their association.

This, then, is a slight and imperfect sketch of what we mean when we say that there are, in nature, no such hard and fast lines of demarcation as those artificial groups which we call orders, genera and species.

It may be hard to believe this all at once, but it is a hypothesis which age and experience will strengthen, and should not be discarded, because so many of the links have died out, or are otherwise missing.

Finally, we are reminded how many species (so called) have been figured, or described, by old authors, of which no representatives have been seen in these latter days, and which were probably good and genuine figures and descriptions, but are now treated with undue suspicion, such as perhaps also adheres to the more recent announcements of forms which have been met with but once or twice in a generation, and then all, except perhaps the names, have passed into oblivion.

Surely there is some interest in these ' missing links ' when regarded in connection with the hypothesis which I have attempted, imperfectly, to illustrate ; and one of the most useful occupations for the field hunter of the present day would be, not so much to hunt for new species, as to recognise the manifold links which unite the old ones.

The latest confirmation of these views will be found in W. G. Smith's ' Synopsis of the Basidiomycetes ' (page 2)—' The Basidiomycetes are highly plastic and variable. No one species is constant in all its characters, and a single example seldom wholly agrees with any other single example of the same species. Examples which appear to be intermediate between allied and sometimes between not allied species, are frequently met with, About one species in ten is perhaps fairly well and distinctly marked, but all species will at times present aberrant characters. Any one character is liable to fail in the determination of species. therefore all the characters must be studied together.'

And in a letter from the same authority, he states :—' There is a striking instance in *Paxillus porosus* (Berk.). I had a drawing of this species unnamed for years ! I kept it with *Boletus*. It has as much claim to a place in the latter genus as in the former. The hymenium is wholly porous.'

In this connection I cannot forget the constant warning of the late Rev. M. J. Berkeley against *long* descriptions of species to which many modern authors were addicted. ' Any good description," he said, ' can be contained in three lines, and exceeding that it is but the picture of an individual.' And he was accustomed to quote the custom of old authors, and especially of Linnæus. Because, as he observed, the description of a species should contain the features which distinguish it from allied species, and *no more*, all other features are merely the variations of individuals, just as a sandy-haired man with blue eyes differs from a black-haired man with brown eyes, or a black pig from a white one. He justly observed, that a competent mycologist would distinguish at once the salient features which characterized one species from another, and did not require many words to write it down. Nor need he ever hesitate for a specific name whilst he kept this feature in view. Fancy and complimentary specific names he regarded as simply evidence of incompetence, or idleness in the person using them.

FUNGUS FORAY AT CASTLE HOWARD.

C. CROSSLAND, F.L.S.

THE twenty-second Yorkshire Fungus Foray (the nineteenth annual), organised by the Union, was held at Castle Howard, September 18th to 23rd. Castle Howard was a wise selection on account of the great wealth of old woodland in the neighbourhood. Permission to the Union to investigate the mycological flora of this magnificent and extensive estate was kindly and readily granted by the Earl of Carlisle.

The district is classic ground from a botanical standpoint. Dr. Spruce, the eminent botanist, (who investigated the moss flora of the Pyrenees, and then for fifteen years braved the hardships attending the exploration of the flora of the Amazon and the Andes, so vividly portrayed in 'Notes of a Botanist on the Amazon and Andes,' edited by his friend, Dr. Alfred Russel Wallace), was a native of Ganthorpe, a little village near Castle Howard. Here, and later at Welburn, his father kept a boarding-school, As a youth, Spruce diligently studied the plant life of this and the Malton District. By the way, Spruce derived his first knowledge of, and love for mosses, from Samuel Gibson, a well-known artizan-naturalist of Hebden Bridge.

Our old and valued member, Mr. M. B. Slater, J.P., who attended the foray on the Monday, has been a keen and constant student of the mosses and hepatics of this locality, in company at one time with Dr. Spruce, whom he often visited during the doctor's sojourn at Welburn, and afterwards at Coneysthorpe.

This also is the district where Mr. Massee first took up the study of fungi, during his residence at Bulmer. To him the ground was familiar, and his visit pleasantly renewed his former acquaintance with his old gathering grounds, where several species new to the British flora were found by him, years ago.

The general meeting-room was the Guest House near the Castle, and most suitable for our purpose; but, unfortunately, we had to billet at the village of Welburn, about a mile and a half away. This reduced the time generally given to the work-room, as we were unable to put in the usual hour before breakfast. Dinner only was served at headquarters.

A beginning was made on Saturday in the woods in the immediate vicinity of the station (Ox Carr Wood and Ben Wood), prior to going up to the work-room. It was near an old stump in a field corner at the end of Ben Wood that *Pluteus cervinus* var. *rigens*, a new British record, was found.

It is our usual custom, as soon as we get settled at head-quarters, to look through the garden, if there is one. Here was one which appeared to have been neglected very much by previous tenants. The present holder is a new-comer, and seems anxious, if possible, to straighten things up a little. Several parasitic fungi were at work. *Uromyces fabæ* was on most of the bean leaves ; *Peronosopra parasitica* on shepherd's purse ; *Phytophthora infestans* on the potato plants and in the tubers ; *Fusicladium dendriticum*, the cause of the 'apple scab,' was abundant on the apples ; this is one of the most injurious of fungus parasites which attack the apple. It is dealt with in No. 131 of the valuable 'Leaflets' issued by the Board of Agriculture and Fisheries, which may be had for the asking, and in Massee's book on 'Plant Diseases.' *Monilia fructigena*, another parasitic fungus pest, was not seen on the apples, but it was picked up on a half-mummified fallen plum. Of course, these and other fungus pests find their way to the best regulated gardens and orchards, but if they are attended to in time, their spreading propensity is curtailed.

Guides to the woods were kindly provided by the agent on Monday and Tuesday. Day after day interesting species were brought in ; one especially so to the writer. This was *Mycena pelianthina* Fr.=*Agaricus denticulatus* Bolton, a remarkably fine species for this genus. It belongs to the Calodontes section, which have dark-edged denticulate gills. The denticulations in *pelianthina* consist of bunches of purple cystidia, while similar structures spring singly, but plentifully, from among the basidia on the gill sides, imparting a rather remarkable appearance to these organs. This beautiful agaric was first found at Halifax, in 1787, by J. Bolton, who described and most appropriately named it *A. denticulatus*. Fries, later, named the same thing *A. pelianthinus*. It has rarely been found, but was met with at Castle Howard during the 1892 foray.

The estate is heavily timbered, and portions of the woods are said to be continuations of original forest ; there are many fine old oaks, a few of which the suns of five hundred summers at least, have shone upon. Other parts have been plentifully planted, thanks to the forethought of the third Earl of Carlisle. The fine avenue, stated to be the longest in England, is formed of clusters of twelve to eighteen grand old beeches, the effect being magnificent. Plantations abound on other parts of the estate. An obelisk in the park, erected by the third Earl in 1731, records, in the following words, the laying out of the plantations, etc., a task commenced in 1702 :—

> 'If to perfection these plantations rise,
> If they agreeably my heirs surprise,
> This faithful pillar will their age declare
> As long as time these characters shall spare ;
> Here then with kind remembrance read his name
> Who for posterity performed the same.'

We thank him heartily, and remember him most kindly. The approximate age of most of the trees is here indicated. Signs of rapid decay are evident among them, and now and again one of the monarchs, of the avenue is blown down. In their old age the beeches are rapidly becoming subject to the attacks of *Armillaria mucida*, a beautiful, white, but slimy parasitic agaric. This appears to be spreading among the aged beeches. It is a fungus which, so far as observations in this country have gone, confines its attentions to this tree, and here it has plenty of scope. It is a wound parasite, reaching its prey, by aid of its spores, through wounds in the bark, caused generally by the breaking away of branches. It has been proved possible to artificially inoculate healthy trees in this way. Its brother parasite, *Armillaria mellea*, is much more destructive, as it attacks various species of orchard and forest trees. There was very little of it to be seen at the time of our visit, however ; but it was there. *Polyporus squamosus,* a parasitic polypore, was also at work on the beeches. A fine specimen growing out of the stump of a broken branch was carefully cut off, along with the stump, and taken to Kew Museum, as a specimen of a timber tree parasite.

Ustulina vulgaris and a few other saprophytic fungi were found on decaying parts of the beech trunks.

Respecting the general run of ground fungi, the season is about three weeks later than usual, and the crop much lighter. Cold summers like the last, if we can call it a summer, retards the mycelial development of saprophytic fungi in the ground, in decaying timber, and among rotting leaves. There has been plenty of moisture, but even this very necessary element, unaccompanied by heat, has not the desired effect. The growth of the ordinary mushroom has suffered from the same cause.

Weather influences notwithstanding, it is almost certain that some uncommon species or another will turn up at each foray. The noble *Agaricus augustus*=*Psaliota augusta* was met with ; while not found plentifully in Britain, it constantly is here. It has several Yorkshire records. In Sweden it is common on old, deserted ant-hills. *Query*—Can it be cultivated in a conidial condition by the ants, and when these intelligent and diligent insects desert old nests, the fungus is left to its own resources, complete its life cycle ?

There was variety if not quantity. Rarely are eleven species of *Pholiota* found at one foray, or eight species of *Amanita*, or sixteen of *Hygrophorus* ; of the latter, *pratensis* and *conicus* were very abundant. *Collybia radicata* was extremely common, and in great variety in size and appearance. So with *Lepiota procera*, at least half-a-dozen forms could have been selected from the tables which inexperienced students might easily have taken for distinct species ; the principal difference being in the markings on the stems, and the manner in which the outer envelope of the sporophore in its infant stage had been broken up during subsequent development.

A. phalloides was one of the eight species of Amanita, the most poisonous agaric likely to be gathered by inexperienced fungus hunters.

Two or three specimens of a whitish, branched, white-spored Clavaria, which does not fit any published description, were brought in. It has been thought best to hold this over awhile to see if further specimens are discovered before publishing a diagnosis, should it prove to be new. It is allied to *C. umbrinella*. The specimens are in the care of Mr. A. D. Cotton at the Kew Herbarium.

Space cannot be afforded for a tithe of the numerous interesting notes which might have been written concerning many of the fungi collected.

Twenty-two myxomycetes were noted, some being in great profusion in both plasmodia and mature conditions ; probably the well-wooded district and quantity of decaying wood accounts for their prevalence. A mass of *Fuligo varians* left the rotting wood on which it was brought in, and found its way during the night on to a plate, where it ripened out.

All the necessary apparatus in the shape of books, microscopes, etc., were provided by the committee, and were at the service of anyone present.

Mr. Massee brought beautifully-mounted slides, showing the grass disease *Cladochytrium gramineum* Busgen. This disease produces scorched, sickly-looking patches in the grass.

A dark-coloured mould, *Hormodendron hordeii* Zopf. was found on *Circæa lutetiana,* which may be considered the first formal British record.

The total number of species determined, including a few taken home for further study by several members, is four hundred and ninety, and eight varieties. Of these, two hundred and forty-four are previously recorded for Castle Howard and Bulmer. Of the remainder, one is a new species to be called *Flammula carnosa* Massee, and to be fully described in a future issue. *Cercospora calendula* Sacc., on cultivated marigold in the Inn garden, Welburn ; *Acremoniella atra* Sacc., on moss and dead leaves ; *Hormodendron hordeii* Zoph., and var. *rigens* of *Pluteus cervinus* are new to Britain.

The following are new discoveries for the county :—

Scleroderma vulgare var. *lævigatum.*
Amanita strobiliformis Vitt.
Tricholoma argyraceum (Bull).
Clitocybe rivulosa (Pers.) Fr. Among grass near Carrmire Gate.
Collybia tylicolor Fr.
Agaricus xanthodermus Gen.
Psilocybe catervata Mass.
Coprinus macrocephalus Berk.
Hygrophorus leporinus Fr. Brought from Scarborough by Mr. Peck.
Marasmius impudicus Fr.
Marasmius cohærens (A. & S.) Fr. (=*Mycena cohærens* Fr.)
Polyporus cerebrinus.
Helvella atra Konig. On the ground in Ray Wood.
Sphærospora confusa (C. K.) Sacc. On the ground in Ray Wood.
Helotium phyllogenon Rehm. On the nerves of decaying poplar leaves.
Molisia mutabilis.
Septoria ulmi Kye. On elm leaves.
Septoria heracli Fckl. On cow parsnip leaves.
Chalara longipes Cke. On decaying bark.

All were gathered in the neighbourhood of Castle Howard, excepting *Hyg. leporinus.*

It was considered by all present that the foray had been one of the most successful and enjoyable, with one exception, hitherto held by this section. There was a good attendance, and each one put a bit of zest into the work, either in collecting or determining, or both.

In addition to Yorkshire members, there were members and friends from Kew, Boston, Derby, Alderley Edge, and Liverpool.

A box of specimens was sent from Scarthingwell Park by the Leeds Naturalists, per Mr. W. D. Roebuck.

The weather was all that could be desired for collecting purposes. On the Monday there were several friends from the Malton Society, including Mr. M. B. Slater.

In the evening Mr. Massee gave a most interesting and instructive address on 'The Origin and Tendencies of Parasitism in Fungi.' Mr. Clarke occupied the chair. Mr. Massee was heartily thanked for his lucid, well-arranged address. We hope to print a pretty full account in a later issue.

On the Tuesday, Mr. Massee presiding, Mr. Clarke read an interesting paper on 'The Common Mushroom: its Varieties and Allies.' The paper practically dealt with the whole British portion of the genus *Psaliota*, of which our common mushroom is the best known, and most useful member. All the information that has hitherto become known regarding the toothsome mushroom, including some of Mr. Clarke's own observations, were included in the paper, which was illustrated by a large series of coloured drawings, life-size, hung round the room. The thanks of the committee and friends were warmly accorded to Mr. Clarke for the paper.

A vote of thanks was unanimously passed to the Earl of Carlisle, for so kindly allowing us to have the run of the estate. The agent was also thanked for providing guides.

The annual business meeting of the section was then held. Mr. Massee was re-elected Chairman; Mr. C. Crossland, Convener and Representative on Executive; Committee as last year, with the addition of Mr. James Needham, all subject to approval at the next Annual Meeting of the Union.

After discussing the place for next year's foray, it was eventually decided to recommend Arncliffe and Mulgrave. It was thought well worth while to pay yet one more visit to Mulgrave to see what can be added to its already very extensive mycological flora.

The following are the additions to the Castle Howard and Bulmer district. Those marked † are additions to Vice-County N.E.:—

Lycoperdon cælatum.
Amanita phalloides.
A. mappa.
A. excelsa.
A. spissa.
Amanitopsis fulva.
Lepiota excoriata.
L. gracilenta.
L. granulosa.
† Var. *rufescens.*
† *L. amianthina.*
Armillaria mucida.
Tricholoma equestre.
T. grammopodium.
† *Clitocybe tumulosa.*
C. geotropa.
C. tuba.
C. metachroa.
C. ditopoda.
Collybia butyracea.

Collybia ingrata.
C. conigena.
C. acervata.
C. atrata.
† *Mycena olivaceo-marginata.*
M. pura.
M. lactea.
M. polygramma.
M. leptocephala.
M. filopes.
† *M. amicta.*
M. acicula.
† *M. juncicola.*
† *Omphalia philonotis.*
O. campanella.
† *O. camptophylla.*
O. bullula.
O. integrella.
Pleurotus ulmarius.
Pluteus phlebophorus.
† *Entoloma porphyrophæum.*
E. jubatum.
E. speculum.
Leptonia solstitialis.
L. asprella.
Nolanea nigripes.
Pholiota togularis.
P. radicosa.
† *P. aurivella.*
P. spectabilis.
P. adiposa.
Inocybe incarnata.
I. echinata.
I. hiulca.
I. eutheles.
I. destricta.
Hebeloma glutinosum.
H. mesophæum.
Flammula flavida.
† *F. connisans.*
F. ochrochlora.
Naucoria conspersa.
† *Crepidotus alveolus.*
C. epigæus.
Bolbitius fragilis.
Cortinarius (Derm) tabularis.
C. (Derm) anomalus.
C. (Derm) sanguineus.
C. (Tela) torvus.
C. (Tela) armillatus.
C. (Tela) ilipodius.
C. (Hygr) castaneus.
Agaricus agustus.
A. campestris.
† Var. *pratensis.*
A. hæmorrhoidarius.
A. comptulus.
Stropharia squamosa.
Also var. *thrausta.*
S. hypsipoda.
Hypholoma pyrotrichum.
Panæolus sphinctrinus.
P. fimicola.
P. ericæa.
Psathyra pennata.
† *Coprinus fimetarius.*
C. lagopus.
C. Gibbsii.
† *C. ephemerus.*
C. hemerobius.
Gomphidius viscidus.
Paxillus lepista.
Hygrophorus (Camar.) *bicolor.*
H. (Hygro.) calyptræformis.
H. (Hygro.) unguinosus.
H. (Hygro.) nitratus.
Lactarius (Piper) involutus.
Russula furcata.
R. cutefracta.
R. fœtens.
Marasmius erythropus.
M. Hudsoni.
† *M. polyadelphus.*
Lentinus cochleatus.
Boletus vaccinus.
B. crassus.
Polyporus elegans.
P. intybaceus.
P. sulphureus.
P. mollis.
P. nidulans.
P. lacteus.
† *P. epileucus.*
P. cæsius.
P. fragilis.
Fomes ulmarius.
F. ferruginosus.
Poria mollusca.
P. sanguinolenta.
Dædalea unicolor.
Hydnum alutaceum.
Craterellus cornucopioides.
Hymenochæte tabacina.
Cyphella Pimii.
Thelephora caryophyllea.
† *T. palmata.*
Clavaria muscoides.
C. abietina.
C. dissipabilis
† *C. acuta.*
Typhula muscicola.
Hirneola auricula-judæ.
Calocera cornea.
† *C. stricta.*
Melampsora circææ.
Uromyces rumicis.
† *Puccinia pimpinellæ.*
On *Myrrhis odorata.*
P. saniculæ.
P. taraxaci. On *Taraxacum.*

Puccinia oblongata. On *L. campestris.*
Nectria coccinea.
Hypoxylon coccineum.
Eutypa spinosa.
Diaporthe rostellata.
Sordaria curvula.
Raphidospora acuminata.
Heptameria doliolum.
Didymosphærella conoidea Wiessl.
Helvella ephippium.
† *Geopyxis cupularis.*
Peziza repanda.
P. succosa.
P. pustulata.
† *Humaria deerrata.*
Lachnea dalmeniensis.
L. hemispherica.
L. albo-spadicea.
Dasyscypha ciliaris.
† *Erinella Nylanderi.*
Cyathicula coronata.
Helotium ferrugineum.
H. ochraceum.
H. lutescens.
H. virgultorum.
Var. *fructigenum.*
H. epiphyllum.
Mollisia fallax.
† *Pseudopeziza albella.*
Orbilia luteo-rubella.
† *Phacidium multivalve.*
Pilaira anomala.
Spinellus fusiger.
Peronospora parasitica.
P. ficariæ.
† *Phoma longissimum.*
Septoria rosarum.
Monilia fructigena.
† *Rhinotrichum niveum.*
Periconia pycnospora.
† *Fusicladium dentriticum.*
Stilbum tomentosum.
S. vulgare.
Graphium flexuosum.

MYXOMYCETES—
Clathroptychium rugulosum.
Cribraria macrocarpa.
C. argillacea.
Arcyria incarnata.
A. cinerea.
Didymium farinaceum.
D. spumarioides.
D. effusum.
Craterium confusum.
C. aureum.
Badhamia varia.
B. panicea.

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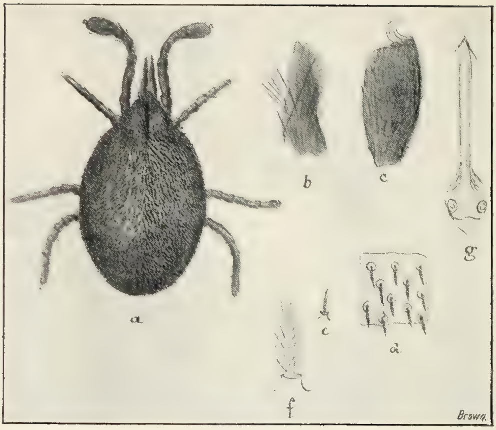
Notes on the Origin of Kingston-upon-Hull, and of the Port of Hull, also on the Camin Charter, the Meaux Register (including the 'old' River Hull Tradition), and Glimpses of Mediæval Hull, by **J. Travis-Cook.** London : A. Brown & Sons. 68 pp., 2/-.

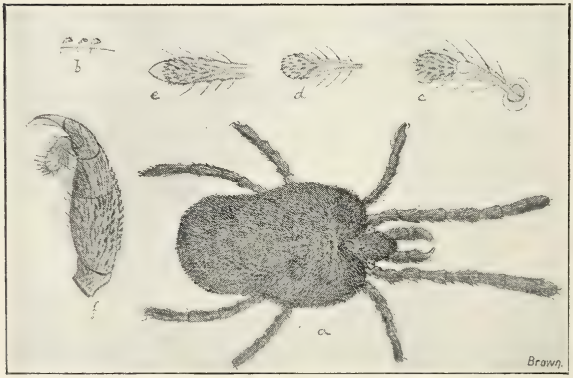
In this book Mr. Travis-Cook, who has written much in past years in reference to old Hull, offers 'the latest, the best, and the ripest fruits (for what they may be worth) of much labour in this particular vineyard.' He would take back Hull's history some six hundred years earlier than would most writers ; though he is admittedly indulging in 'historic imagination.' He concludes that 'our founders were a little band of eight families ; farmers as well as warriors, possessing one plough of eight oxen.' This may be so, or it may not ; but without any evidence it is difficult to say. When, however, we are told 'we may even go a step further, and conceive the existence of a prior British hamlet or fortress on the spot where our founders landed,' we must cry halt, or that one step will lead us into a hole. In British times, as is amply proved by geological evidence, this area was under water, and even in Roman times the land around what is now Hull was not habitable. Whilst we admire the author's patriotism in endeavouring to make the old town of Hull even more ancient, we can only regret that his ideas are unsupported by evidence. His sketch-maps, also, shewing Hull in the VI. and XIV. centuries, though ingenious, are not convincing. Still, these 'ripe fruits' are to be eaten, and if we don't swallow too many, no great harm will result. But there is much other interesting information in the book dealing with Hull in later times, when (the silt having formed) the author is on firmer ground. It is well produced and cheap.

BRITISH MUSEUM NATURAL HISTORY



a.—***Ottonia valga.***
b.—End of fourth joint of palpus.
c.—End joint of first leg.

d and *e.*—Papillæ of body.
f.—One of these much enlarged.
g.—Crista.



a.—***Ottonia clavata.***
b.—Papillæ of body.

c, *d* and *e.*—Papilla much enlarged.
f.—Palpus.

British Earthmites.

SOME BRITISH EARTHMITES.

Trombidiidæ.

(PLATE XVIII).

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

Ottonia valga.—This very interesting little creature has several marked characteristics. I have no doubt that when alive it is a very handsome mite. I have met with only one specimen, however, which was found by Mr. Wm. Evans, of Edinburgh, who took it in moss, at Aberfoyle, in 1905. and sent it to me in February 1909. All colour had then disappeared from long action of the preservative fluid. It is rather small in size, and almost as broad as it is long ; Mr. Soar's figure makes it appear as quite oval. This, however, is probably the result of slight pressure by the cover glass, as when I first examined it without any pressure, it was rather wider at the shoulders than elsewhere, as is commonly the case in most of these mites. Mr. Soar gives the length as 0.96 mm., and breadth, 0.64 mm. The two front legs are longer and stronger than the others, the last joint is much the largest. It is flattened from side to side, and somewhat quadrangular (see figure *c*), it is also turned outwards, making the creature look ' splay-footed—hence the name *valga.* It is possibly the mite described and figured by Koch (15.24) as *Trombidium plancum.* The hairs or papillæ of the body are remarkable, being spindle shaped and pectinated, and also provided with a number of rather long fine hairs, requiring a fairly high power, and good light to see them perfectly (see figures *c, d* and *f.*) Each hair or papilla is set in a socket, like a candle in its stick. The edge of the flange is, however, plain, not cut into teeth, like some of those belonging to ' bullata ' or conifera. The two claws at the end of the fourth internode of the palpus are nearly equal in size and thickness (figure *b*). There is also a row of short, thick hairs or spines on one side resembling a comb (see fig. *b*). The crista also (fig. *g*) differs considerably from any previously figured by me.

Ottonia clavata. This is one of the largest and most beautiful mites of this division. It is the colour of red sealing-wax, and in shape resembles *T. fuliginosum.* The eyes are very prominent, and situated at each side of the cephalothorax. The front legs, as usual, are the longest and strongest, and have

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the last joint somewhat clubbed, as in figure *a*. Many of the hairs on the legs and palpi are beautifully feathered (see figure *f*). The fourth joint of the palpus terminates in two claws (figure *f*). The papillæ on the dorsum are not crowded, and in structure are very peculiar, reminding one of a savage war-club. They are enlarged towards the distal extremity, and look as if studded with spikes (see figures *c*, *d* and *e*). Even when mounted in balsam they retain much of their colour, which adds greatly to their beauty. I am sorry to say that I have only seen one specimen of this mite, which deserves more detailed description. I think, however, that the peculiar papillæ are sufficient to differentiate it from other members of the family. It was sent to me in December 1907, by Mr. W. Evans, of Edinburgh, who found it, I believe, in April 1906.

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Text-book of Petrology, by **F. H. Hatch.** London: Swan Sonnenschein. 5th edition, 1909. 404 pp., 7/6 net.

The scope of this work is perhaps best described by its sub-title—'A summary of the modern theories of Petro genesis, a description of the rock-forming minerals, and a synopsis of the chief types of the igneous rocks and their distribution as illustrated by the British Isles.' So many additions have been made to our knowledge of British Petrology in recent years that the present edition of Hatch's well-known text-book has been practically entirely re-written, and besides several new illustrations, the present volume contains many new features. These include a fuller list of references to literature, more complete lists of chemical analyses, the separation of the part dealing with the classfication of rock-types from that dealing with their distribution, and a Table for the Determination of the Chief Minerals of Igneous Rocks in thin section. There is a very good index.

Radioactivity and Geology, by **Prof. J. Joly.** London: Constable & Co. 287 pp., 7/6 net.

Most of those who were fortunate enough to squeeze in the crowded lecture theatre at the Dublin Meeting of the British Association, and hear Prof. Joly's presidential address to Section C., as well as those who were left outside, hoped that his address would eventually appear in a more extended form. This hope has been realized, and the book is before us. There is no doubt that the author takes a foremost place in the application he has made of the recent discoveries in radioactivity, to geological science. It is quite possible that geologists have been too hasty in forming generalisations as to the influence of the properties of radioactive elements upon such subjects as the age of the earth, etc., and even Prof. Joly admits that his book contains much that is speculative. Still, if his observations and conclusions were not published, they could not be discussed and criticised, and progress would be slow. As it is his views are carefully and clearly expressed, and no one more than the author will welcome a conscientious and serious criticism of the ideas put forward. No doubt as time goes on, views will change as to the importance of the radioactive elements in the history of our planet; but, nevertheless, Prof. Joly will always receive credit for his pioneer work in a difficult direction. Amongst the subjects discussed are the foundations of Radioactive Science; Underground Temperature and Radioactivity, the Instability of the Earth's Crust; Mountain Structure; the Interior of the Earth; the Age of the Earth, etc.

THE ANNELID FAUNA OF WORCESTERSHIRE.

Rev. HILDERIC FRIEND,
Great Malvern.

THOUGH it is twenty years since I began the study of our Annelids, and I have during that period made note of everything which has come in my way respecting County Records, I find that I have never yet seen a single allusion to the species which exist in Worcestershire. I can hardly believe that the subject has been absolutely neglected ; and should be glad to learn that someone connected with the different Natural History Societies of the County has published lists in some of the local publications. Should such lists exist, my records will be supplementary ; but if there are no published reports, I shall be happy in being able to lead the way, by publishing the results of my own observations. The County of Worcester is undoubtedly rich in species, and my lists already contain some records which are of more than ordinary interest.

Our native Annelids fall into several groups. The best known section is that which contains the larger earthworms. Next to this comes the group which includes the fresh water species, such as the different species of Tubifex and their allies. Then we have the large class of white worms or Enchytraeids, which are found on land, by the side of water, or sometimes even leading a purely aquatic life. In addition to these we have a fourth group, consisting of very minute water-worms, which do not live in the mud like the Tubificidæ, but are usually found living a free life among the algæ and weeds. These include the pretty and interesting Nais and its congeners.

We will begin with the best known. It was with these that Darwin was concerned when he wrote his 'Vegetable Mould,' but, whereas he assumed that the British species of earthworms amounted to fewer than ten, we now have a list of indigenous species numbering thirty at least. For a long time all the earthworms were known by the generic name of *Lumbricus,* which Linnæus employed ; but Savigny in 1826 used the term *Enterion.* As knowledge progressed, it was found that there were different genera, and the name *Allolobophora* was adopted for a group which displayed a form of head whose insertion into the peristomium differed from that of the type. A third genus, containing worms of a semi-aquatic nature, was also separated off, and named *Allurus,* on account of the different form of its tail.

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More recent research has led to the further splitting up of the genus *Allolobophora,* so that we have learned to use such terms as *Dendrobæna, Eophila* and *Helodrilus, Octolasion, Hypogaeon* and *Aporrectodea, Eisenia* and *Bimastus*; while *Allurus* has been changed to *Eiseniella.* If these changes are at times confusing, they at any rate serve to indicate that our knowledge of the subject is more extensive than of old, while they also remind us that the student of system finds wide differences between species which seemed at one time to be very nearly related.

So far as our native species of *Lumbricus* are concerned, they are clearly defined and readily identified. They may be said to consist of terrestrial annelids of a purplish colour, with somewhat flattened tails, a head or prostomium which entirely bisects the first segment or peristomium; and having a girdle which is uniformly composed of six segments, the four innermost of which carry the *tubercula pubertatis.* The male pore is on the fifteenth segment, and is conspicuous in some species, but obscure in others.

There are but five species of *Lumbricus* at present known in the British Isles, and one of these (*Lumbricus friendi* Cognetti) which I first discovered and described some years ago (as *Lumbricus papillosus* Friend), is at present known 'only in the South of Ireland in the British Isles, and has only been found elsewhere at considerable elevations in the Pyrenees and the Alps.'*

The remaining species, four in number, are all found in Worcestershire. I have not made an exhaustive survey of the county, and cannot therefore give a long list of localities; but this hardly seems necessary in the case of species which are so generally and widely distributed. It may be well, perhaps, to add the characteristics of each species.

1. LUMBRICUS TERRESTRIS L., is the largest English species of the true *Lumbrici.* It sometimes attains a length of six or more inches, and preserved specimens range from six to fifteen centimetres. Eisen speaks of examples from Scandinavia, which are twice that length, and have more than six segments to the girdle. He is a good observer, but I fancy his record was an early one, made when there was much confusion between this species and *Allolobophora longa* Ude. I have never, in all

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* Southern, *Contributions towards the British and Irish Oligochæta,* 1909.

my experience, seen a genuine *Lumbricus* with more than six girdle segments, and these extend in the present instance from segments 32 to 37, the tubercula being on segments 33 to 36. It may be graphically presented in the form of a fraction, thus—$\frac{32-37}{33-36}$. The male pores on the fifteenth segment are connected with prominent papillæ.

Found around Malvern, known to every part of the British Isles, and widely distributed in Europe (Italy, France, Austria, Hungary, Sweden, Norway, Denmark, etc.), and North America See Rosa, *Revisione dei Lumbricidi*, p. 25.

2. LUMBRICUS RUBELLUS Hoffmeister. Considerably smaller than the former, but similar in colour and general appearance, so that robust forms might easily be confused with the smaller forms of *L. terrestris* L. But they are instantly differentiated by means of the girdle and male pores. In the case of *L. rubellus* the pores cannot be seen, while the fractional index for girdle and tubercula is $\frac{27-32}{28-31}$. In Northern Europe, this species also is said to attain a much larger size than with us, but the girdle segments do not change.

Found around Malvern; general distribution as in the case of *L. terrestris* L.

3. LUMBRICUS FESTIVUS Savigny. In size and general appearance hardly distinguishable from *L. rubellus*. The male pores are, however, prominent, and the index for girdle and tubercula is $\frac{34-39}{35-38}$. Hence the two are at the extremes of the line of development. This will be best understood by reference to the following table, which gives a bird's eye view of the segments on which the tubercula are situated. For finding the girdle one has only to add a segment to each end.

SPECIES.	Segments carrying *tubercula pubertatis*										
Lumbricus rubellus Hoffmeister	28	29	30	31	..	..	..	..	..	..	..
,, *castaneus* Savigny	..	29	30	31	32	..	..	..	..	..	..
,, *meliboeus* Rosa	..	..	30	31	32	33	..	..	..	..	..
,, [*Tyrtaeus* Savigny	..	..	..	31	32	33	34	..	..	..	.]
,, *studeri* Ribaucourt	..	..	..	..	32	33	34	35	..	..	..
,, *terrestris* Linnaeus	..	..	..	..	..	33	34	35	36	..	..
,, *friendi* Cognetti	..	..	..	..	..	..	34	35	36	37	..
,, *festivus* Savigny	..	..	..	..	..	..	..	35	36	37	38

This latter worm has had a somewhat romantic history. It was first named *Enterion festivum* by Savigny in 1826, and eleven years later Dugès gave particulars respecting it under the name which it now bears. It was then lost to sight for upwards of half a century. At last I discovered it in England, where it had never been recognised before, except very doubtfully from Berwick-on-Tweed (Johnston's 'Catalogue of Worms,' p. 59). As it was apparently new to Britain and to science, I named it *Lumbricus rubescens* ('Nature,' 1891, p. 273). It was afterwards re-discovered on the Continent, and is now placed beyond all doubt. I found it some years ago in association with *L. rubellus*, and gave some account of my observations in a paper ('Naturalist,' October 1892) entitled 'Hybridity among Worms,' to which Dr. Rosa ('*Revisione dei Lumbricidi*,' p. 27), makes special allusion. The fuller history of this interesting species may be read in various journals, including the issues of the 'Bradford Scientific Journal' for the present year.

Found at Malvern; and also recorded for various parts of England, Wales, and Ireland, by myself. I have also received it from Normandy. It is abundant around Paris.

4. LUMBRICUS CASTANEUS Savigny, is the smallest of the true *Lumbrici* in Great Britain. In colour and shape it is similar to the last, but if the girdle segments are our guide, it comes next to *L. rubellus*, Hoff., the fractional index being $\frac{28-33}{29-33}$. It is very active, and has a habit of gliding rapidly backwards when wanting to avoid danger.

It is greatly to be hoped that further research in unexplored parts of Britain may bring to light other genuine species of Lumbricus. *L. studeri* Rib. has never been reported, though one does not see why it or *L. melibœus* Rosa, should not be found. The notices of *L. tyrtæus* Savigny still need confirmation.

It is only possible for me, in the present paper, to refer to one other species, as it is necessary, for the sake of clearness, to reserve all the Allobophoras for treatment together. I allude to *Allurus*, a semi-aquatic worm which occurs everywhere in Great Britain, and is liable to considerable variation. We have undoubted evidence of the existence of more than one species in these islands, but so far, the material collected has been insufficient for the purposes of science.

5. ALLURUS (EISENIELLA) TETRAEDRUS Savigny. This little

worm was first described by Savigny as *Enterion tetrædrum*, on account of its square tail (whence also the name *Allurus*). It was kept under notice thenceforth by all the authorities such as Dugès, Grube, Eisen, Oerley, Rosa, and others ; but, though recorded by Johnston in 1865, was reported as new to Britain in 1888. In that year it was found in Dorset, and as the discoverer shortly afterwards became my neighbour and personal friend in Carlisle, his narration induced me to take up the pursuit. Beddard of London, and Benham of Oxford were just then giving the subject attention, and it may be said that a new era in the study of British Annelids dates from that period. Beddard has continued the work ever since, and in 1895 produced his magnum opus: a 'Monograph of the Oligochæta.' Rapid strides have been made since that year, so that if the work were brought up to date, it would probably contain twice as many species, while the margins would have to be wide enough to receive as many more.

Allurus differs materially from *Lumbricus* in externals. The type is from one to two inches in length, usually a dirty brown, but varying much in colour, with a square tail, the male pores on the thirteenth segment, the girdle extending from the twenty-second to the twenty-seventh, or thereabouts, and the tubercula from the twenty-third to the twenty-sixth, represented thus—$\frac{22-27}{23-26}$.

Found at Malvern, Powick, and elsewhere. It is to be met with wherever there is water, and is not only recorded for every part of the British Isles where search has been instituted, but also for almost every country in Europe, for Teneriffe, Valparaiso, and elsewhere.

In my next contribution the different species of Allolobophora at present known to occur in Worcestershire will receive attention. The white worms and water worms will be reserved for a later paper.

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Memorials of Charles Darwin. London. 50 pp., 6d.

It may quite possibly never again happen that so many interesting memorials of Charles Darwin will be gathered together as were recently at the British Museum (Natural History). The catalogue of these memorials, issued at the small price of 6d., is therefore a most valuable record. The guide book has been prepared by Dr. W. G. Ridewood, under the superintendence of Dr. Sidney F. Harmer, who has written an interesting Preface. Over two hundred and fifty exhibits are minutely described ; the specimens being exhibited in twenty-four cases.

THE CHEMISTRY OF SOME COMMON PLANTS.

P. Q. KEEGAN, LL.D.,
Patterdale, Westmorland.

Hair Moss (*Polytrichum commune*).—This plant forms tufts and cushions of pure greenery in woods and on open land where the heather grows. The chemistry of mosses as compared with those of ferns and fungi, is decidedly tame and bald—a circumstance that is evidently connected with the structure of their cells, especially of their cell-walls. Most, or at least a great deal of their chemical constituents seem to be absorbed, grasped in, or bound up in a very intimate manner with the cellulosic skeleton of the cell. On 11th June, a dried gathering of the plant in fruit yielded to boiling benzene about one per cent. of a white, waxy matter. The alcoholic extract was acid and faintly bitter, and had no tannoid or tannin, it gave a red-brown colour with iron alum, and very small precipitates with bromine water, and with acetate of lead; also it gave reactions of cane-sugar, while a red-brown substance was extracted by ammonia from the residue insoluble in water, which consisted mainly of a resinous substance dissolving in sulphuric acid, with a brown colour passing to a splendid violet. There was no extractible proteid or starch; there was, however, a considerable quantity of mucilage taken up by dilute caustic soda solution, and a substance soluble in amyl alcohol, which dissolved brown in sulphuric acid. The ash of the plant was very small in quantity, and contained 41.9 per cent. soluble salts, 16.3 silica, 4.5 lime, 11.4 oxide of iron, 4.9 P^2O^5, 5.1SO^3, with some manganese. The above analysis recalls that of lichens rather than that of ferns or mushrooms, notwithstanding the total absence of the highly tinctorial lichen acids and high quinone derivatives associated therewith. In fact, it occurred to me during and in view of the analyses that mosses must be a class of plants specially created, so to speak, and absolutely distinct from all other members of the vegetable kingdom. Their cell-wall, as aforesaid, is the chief seat of the chemical constituents. It contains no lignin, but has pectin, and only yields cellulose reactions after boiling with dilute alkali; hence the soluble carbohydrates are here converted with special facility into insoluble ones, and these again into cellulose. By prolonged boiling under pressure in dilute caustic soda, Czapek obtained a phenolic body, which he named sphagnol, and also a tannoid or tannin which is iron-greening and precipitates gelatine; both of these constituents being originally present in the cell-wall as compounds (esters) of cellulose. The unparalled local, geographical, and climatic distribution of mosses is evidently indissolubly connected with the marvellous structure, and constitution of the skeletal framework of the cell.

COMMON REED (*Phragmites communis*)—This plant forms a sort of hedge by the margins of lakes and in marshy places. ‘The wavy swell of the soughing reeds’ is a spectacle familiar to the wanderer in these haunts. This grass belongs to the tribe Festuceæ, which also includes many of the abundant and familiar species of our meadows and pastures. The rootstock is thick, jointed, and extremely creeping, it contains much sugar, is very nutritious, and has 6 per cent. pure ash yielding 57.7 silica according to Fittbogen. The leaf is traversed by a large number of nerves highly sclerified and lignified, and is protected also by bands of sub-epidermal fibres, with very thick walls; the organ exhibits great power of transpiration. On 20th August the dried blades yielded about 2 per cent. wax, with much carotin; this wax forms a fine closely adherent layer on the lower epidermis, and contains a solid hydrocarbon, so that it rapidly separates from boiling alcohol; little or no chlorophyll was withdrawn from the leaf by boiling benzene, or by boiling acholol alone, it is only when the leaf is first extracted by benzene and then boiled in alcohol that the green pigment is dissolved in great quantity, depth, and intensity. The alcoholic extract (after benzene) contained a distinctive quantity of a tannoid which seems to be quercetin or fisetin, it exhibits great tinctorial power, the reactions with iron, lead, and alum salts being unusually clear and brilliant; there was no tannin or free phloroglucin, but cane-sugar was indicated, and a large quantity of a resinous substance which dissolved in sulphuric acid with a deep brown colour passing to a splendid violet. There was a good deal of pectosic mucilage and reserve starch (unextractible), and crude fibre (52.4 per cent.), but no oxalate of calcium. The ash of the leaf amounted to 7.4 per cent., and contained 20 per cent. soluble salts, 45.4 silica, 10.4 lime, 4.8 P^2O^5, 3.7, SO^3 and 4 chlorine; there was a good deal of manganese, but no soluble silica or carbonates. The foregoing analysis throws clear light on the phenomena of grassy vegetation. We see how thoroughly the chlorophyll is ‘protected’ by the solid wax from the attack of external agencies. The wax also serves to ' protect ' the leaf from the withering effects of excessive transpiration. The chlorophyll itself is of extraordinary depth, and richness of tint, notwithstanding the enormous amount of silicia in the ash, which is indicative of imperfect and exhausted vegetative power. There are no mycorhiza in or on the roots, and there is a strong excretion of water from the leaves, and with it silica and salts of lime. The process of deassimilation does not seem to surpass the tannoid and resin stage, no true tannin being produced, except perhaps a little in the floral parts. The soluble carbohydrates pass to lignin with considerable facility, and the absence of acids indicates the comparative immobility of the albumenoids.

TUFTED VETCH (*Vicia cracca*).—This tall conspicuous plant, crowned with a rich purplish blue raceme of flowers, springs up in hedges, waste places, and amid the grassy herbage of open sunny fields and pastures. The chemistry is comparatively tame and uninteresting. The official analysis of the dried plant reports 27.4 per cent. albumenoids, 1.4 fatty matter, 20 fibre, and 6.8 ash. On 18th July, the dried overground parts contained 1.7 per cent. of carotin and wax, with no glyceride. The alcoholic extract seemed to have traces of a tannoid like luteolin, and also some alkaloidal substance, a resinous matter, and a little cane-sugar and citric acid; there was no tannin, glucose, or bitter principle. There was much mucilage, and oxalate of calcium, but no extractible proteid or starch. The ash amounted to 6.8 per cent., and contained 19 per cent soluble salts, 2.2 silica, 40.6 lime, $4P^2O^5$, 2.51 SO^3, and 2.2 chlorine; there was a little manganese and very much insoluble carbonate. Altogether the analysis is tame and bald; the chief feature being the paucity or absence of benzene derivatives, and the presence of an abundance of lime. It would seem that the totality of the tannic chromogen was concentrated in the floral parts, but the pigment thereof is by no means pure; it cannot be compared with that of the Cranesbills, for instance, although like the latter, it forms remarkable pure blue compounds with the organic salts of manganese. The black or olive shade of the seeds seems to be due to tyrosin.

GARLIC HEDGE-MUSTARD (*Alliaria officinalis*)—This fine plant flourishes under hedges and in shady waste places. In the first year the stem is very short, and the root becomes fleshy with the starchy reserve materials then stored up; in the following year vegetation is resumed very early, and the stem now grows very rapidly, the flowers appear soon, and the root reserves are consumed. The whole plant when bruised emits a strong smell of garlic, due to the action of the ferment myrosin on a glucoside yielding sulphide and sulphocyanide of allyl. On 24th May, the whole dried leaves yielded 2.7 per cent. of wax and carotin with a little fat-oil, but no resin; the alcoholic extract contained a red-brown substance, whose solution with iron salts gave a nearly black colour, with chloride of tin a bright yellow colour, and with iodine a deep violet flocculent precipitate which seems to indicate a derivative of pyrogallol, perhaps sinapin or sinapic acid; there was only a little mucilage and no sugar of any kind, and very little extractable starch. The ash of the overground parts yielded 56.4 per cent soluble salts, 3.1 silica, 14.8 lime, 3.5 magnesia, 9.5 P^2O^5, 12.1 SO^3, and 6.3 chlorine; there was only a little iron, manganese, or carbonates. The analysis indicates a strange fixity of the albumenoids and the carbohydrates; and this fact seems to account largely for the invariability of the plant under the influence of culture, and its incapability of forming hybrids with nearly allied species.

LESSER CELANDINE (*Ranunculus ficaria*)—This is Wordsworth's favourite flower, and therefore worthy of special reverence by all scientists who revere the poet who shunned the town and clung to the country. The subterranean organs (tubers) are morphologically comparable to those of certain Orchids, and likewise have endophytic mycorhiza; they contain an irritant camphoraceous substance (anemonal), also starch, cane-sugar in August, glucose and other sugars in February. On 16th May, the dried leaves and petioles contained 1.2 per cent. of wax, with a good deal of carotin and traces of fat-oil; also a tannoid yielding the reactions of luteolin, some glucose and cane-sugar, a little resin, but no saponin or free phloroglucin; also much pectosic mucilage and starch, with a little oxalate of calcium and proteid; the ash amounted to 13.7 per cent. in dry, and contained 61.2 soluble salts, 6.8 silica, 9.2 lime, 2.2 magnesia, with a little manganese, 3.5 P^2O^5, 4.4 SO^3, and 12.8 chlorine; there was very much soluble carbonate. The carotin which tinges the corolla does not occur in a granular form; the epidermal cells contain a highly refractive yellow oil, and the subepidermal layer is densely filled with minute starch-granules ; the nectaries are in the corolla, which also produces crystals of oxalate of calcium. In some varieties of this plant the pollen is aborted, the ovules infertile, or the embryos when produced are undifferentiated. The analysis reveals a brisk movement of the albumenoids, and a considerable productiveness of carbohydrates.

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HISTORY AND TOPOGRAPHY.

A Manual of Roman Antiquities, by **W. Ramsay,** Revised by **R. Lanciani.** London : C. Griffin & Co. 573 pp., 10/6.

This well-known manual has now reached its eighteenth edition ; and whilst it is very familiar to and has long been used by classical scholars, we should like to draw attention to the book as likely to prove of very great service to the increasingly large number of people who, particularly in the northern counties, are taking an interest in the Roman remains of which the country is so rich. Whilst the manual deals with almost every possible branch of Roman history, that relating to their military and naval life, their method of building encampments, etc., is of particular value. In this connection the contributions of Prof. Lanciani, who has done so much in connection with the excavations near Rome, are of extreme interest. By the use of small but clear type, with carefully placed headings, and wealth of footnotes and references, the volume is kept within reasonable compass. At half-a-guinea it is exceedingly cheap.

The Rivers of Axholme, with a history of the navigable rivers and canals of the district, by **G. Dunston.** London : A. Brown & Sons. 155 pp., 4to, Maps. 10/-

Those who know the keen business ability of the author may at first be surprised at the fact that he has turned antiquary, and written a book. But it is soon apparent that there is method in his — work ; and whilst it contains some most useful and most valuable information, we find he has soon descended from the peat to the coal measures ; and from facts about the old form of Hatfield Chase to figures bearing upon the workable coal which undoubtedly will some day entirely change the aspect of this rare tract of natural country. Mr. Dunston first tackles Abraham de la Pryme, who was gifted with a powerful imagination, and then quotes the Survey Memoirs and numerous other authorities in reference to the geological history of the area. He has also unearthed a number of very interesting plans shewing the condition of Hatfield Chase and its adjoining watercourses in the sixteenth and seventeenth centuries. These have been reproduced in a way that is all that can be desired, and in themselves are of great historical value. After dealing with the early history of the Island ; Axholme during the middle ages ; before and after the drainage ; he deals in turn with the history of each of the various navigable rivers and canals in the district ; but these chapters are of most interest from a commercial standpoint. There are some valuable appendices, dealing with XVIth century enquiries, Vermuyden's agreement with Charles I., Smeaton's report, etc. Of peculiar interest is a reproduction of a fine painting of ' King Charles I. killing deer driven into Thorne Mere.' This shews the way in which some hundreds of deer were driven into the lake by beaters, and were then surrounded by about fifty boat-loads of ' sportsmen,' who simply butchered the helpless animals. Truly a kingly sport !

ON THE GEOGRAPHICAL DISTRIBUTION OF MOLLUSCA IN SOUTH LONSDALE.

REV. C. E. Y. KENDALL, B.A., J. DAVY DEAN, AND
W. MUNN RANKIN, M.Sc., B.Sc.

(*Continued from page 381*).

Clausilia bidentata parvula Turton. Associated species :—

Vitrina pellucida Müll.
Vitrea lucida Drap.
,, *cellaria* Müll.
,, *alliaria* Miller.
,, *pura* Alder.
Pyramidula rotundata Müll.
Helix hortensis Müll.
Pupa cylindracea da Costa.
Cochlicopa lubrica Müll.

This form differs from the true *bidentata* in habit and in nature of habitat, and may well prove to be like *C. rolphii* almost subterranean. It is found with the *Vitreæ* under the loose mossy stones in the dry upper wood.

Limax cinereo-niger Wolf. Associated with :—

Agriolimax agrestis L.
Arion hortensis Fér.
Vitrea alliaria Miller.
Pyramidula rotundata Müll.
Hygromia hispida L.
Pupa cylindracea da Costa.
Cochlicopa lubrica Müll.

The above is a sub-association connecting with the one just given, and is characteristic for the loose stones lying among the dry carpet of ' Yew-needles ' and Holly leaves, as distinct from the luxuriant moss-growth under the Ash.

Sub-section—HAZEL AND ASH COPSE.

Dominant—*Pomatias elegans* Müller. Associated species :—

Vitrina pellucida Müll.
Vitrea cellaria Müll.
,, *nitidula* Drap.
Helix hortensis Müll.
Hygromia rufescens Penn.
Ena obscura Müll.

This species, restricted in Britain to the Calcareous soils of England and Wales, reaches at Meathop one of the most northerly stations. As in the case of *Clausilia parvula* (Turton), the period of hibernation is an extended one, usually from Mid-October to the first week in May. Its habitat is described by Reeve as being chiefly in the vicinity of water, not in wet places, but at the roots of shrubs near the sea coast. At Arnside and Silverdale, it is abundant on the Hazel-covered slopes which face the shore, but it is equally abundant in the Hazel and Ash copses near Haweswater. We have also taken this species in abundance on the chalk in Sussex, where it occurred on a dry bank sheltered by a Hazel copse.

LIMESTONE PAVEMENTS.

Dominant :—*Helix nemoralis* L. Associated species :—

Arion ater L.
Agriolimax agrestis L.
Pyramidula rupestris Drap.
Hygromia rufescens Penn.
Helix aspersa Müll.
Pupa cylindracea da Costa.

This species, though by no means restricted to calcareous soils, is characteristic of the limestone pavements. On the

Hygromia rufescens Pennant. Associated with :—

Arion ater L.
Agriolimax agrestis L.
Vitrea cellaria Müll.
,, *alliaria* Miller.
Vitrea nitidula Drap.
Helix hortensis Müll. (rare).
,, *nemoralis* L. (locally).
Cochlicopa lubrica Müll.

This species might at first sight appear to be universal, but apart from the neighbourhood of gardens, and the influence of such artificial habitats, its place would seem to be on the margins of the Oak-Birch woods of a somewhat damp type, occurring plentifully among the nettles and brambles.

Vertigo alpestris Ald. Associated species :—

Vitrina pellucida Müll.
Vitrea alliaria Miller.
Euconulus fulvus Müll.
Hygromia rufescens Penn.
Cochlicopa lubrica Müll.
Pupa cylindracea da Costa.
Vertigo pusilla Müll.
Sphyradium edentulum Drap. (rare).
Clausilia bidentata Ström.

This species is characteristic of the marginal wood, and while associated constantly with *V. pusilla*, it is evident that its true place is here rather than in the Ash woods. Its centre of distribution is further north. It is the *Vertigo* of the Lake District, while *V. pusilla* gradually disappears in that direction, ranging further south, however, than *V. alpestris*. While abundant in the Limestone area, it is even more abundant in the Silurian region. It is thoroughly well distributed, and where it occurs is found plentifully in damp situations on the low mossy walls.

Zonitoides excavatus Bean. Associated with *Pyramidula rotundata* Müll. (Dominant), and :—

Limax arborum B. Ch.
Agriolimax lævis Müll.
Arion subfuscus Drap.
Vitrina pellucida Müll.
Vitrea cellaria Müll.
,, *alliaria* Miller.
Vitrea nitidula Drap.
,, *crystallina* Müll.
Euconulus fulvus Müll.
Punctum pygmæum Drap.
Cochlicopa lubrica Müll.

This species is characteristic of the purer Oak woods of a somewhat damp type, and of which this association is typical. It is, however, not so abundant in this district as it is in the Oak woods of the Coal Measures in South Lancashire and Cheshire, in which the characteristic flora is blue-bell, soft grass and bracken.

(*b*) *Dy :* Heathy Section.

Beyond an occasional *Pyramidula rotundata* there are no conchological features that can be at present given.

lower ground in the district it is extremely local and rare. The association is that of a woodland fauna of a drier type merging on pasture.

Dominant :—*Balea perversa* L. Associated species :—

Pyramidula rupestris Drap.
Clausilia bidentata Ström.

This species, rarely taken here on trees, is abundant in the very driest positions, so abundant, in fact, as to constitute quite a feature. It occurs frequently also on high exposed walls, in clusters under the topmost stones.

II.—THE OAK-BIRCH FORMATION.

(*a*) *Damp :* Grassy section.

Vertigo substriata Jeff.
Acanthinula aculeata Müll.

These two species while not associated together as a rule, are typical of the Oak-Birch woods. *A. aculeata* is one of the commonest snails of the Lake District proper, and *V. substriata* seems to be most abundant in the damp woods of the Silurian region, and is only taken locally on the Limestone. *A. aculeata* is well established also in the Oak-Birch woods of the Lune Valley.

Dominant :—*Clausilia bidentata* Ström. Associated with :—

Vitrina pellucida Müll.
Vitrea alliaria Miller.
Pyramidula rotundata Müll.
Hygromia rufescens Penn.
Pupa cylindracea da Costa.
Cochlicopa lubrica Müll.

The extraordinary abundance of this species is most noticeable, especially towards the margins of the woods. It is one which would seem to avoid the Oak-Birch woods of the Dry Heath section. In the damp Ash-Oak woods of the limestone, it is also one of the dominants and like *H. arbustorum,* there shows a Beech influence, becoming abundant again further north in Beech woods. In the purer Ash woods it is largely replaced by *C. cravenensis,* and when it does occur tends towards the var. *suttoni* Westl.

Helicigona arbustorum L. Associated species :—

Arion ater L.
Limax maximus L.
,, *marginatus* Müll.
Pyramidula rufescens Penn.
Helix hortensis Müll.

The true habitat of this species is the wood-margins of the northern Silurian region. It is very abundant in the damp woods of the Lake District, and in a more stunted form it extends its range to a considerable elevation. South of the Kent Valley it persists only in isolated colonies, chiefly in damp meadow grass bordering a wood slope. It is very scarce indeed on the Limestone.

NOTES ON EAST RIDING SPIDERS IN 1909.

E. A. PARSONS AND T. STAINFORTH.

In spite of the inclement weather prevailing during this season of 1909, the result of the work accomplished amongst spiders in the East Riding has been highly satisfactory.

Not only have 22 species been added to the local list which appeared in the 'Transactions of the Hull Scientific and Field Naturalists' Club,' (Vol. IV. part 2, 1909), but many additions have been made to the Yorkshire MS. list, which is in course of preparation by Mr. W. Falconer, of Slaithwaite; and specimens of both sexes of *Cornicularia kochii* Camb., a species new to Great Britain, have been taken on the Yorkshire shore of the Humber, and at several points on the North Lincolnshire shore. (See 'The Naturalist,' Aug. and Sept.). To Mr. Falconer we are deeply indebted for his courtesy in identifying all the species referred to in this paper.

The most fruitful source for new records, as in past years, has been the Humber foreshore and Spurn Point.

Humber Shore.

Differing in character from any other part of the Riding, the Humber shore yields several peculiar forms. The most important discovery apart from that of *C. kochii*, was *Lycosa purbeckensis*, var. *minor*, F. O. P. Camb., a notable addition to the Yorkshire list.

On a coldish day, early in May, the compilers obtained two males and one female of this species, hidden at the roots of saltmarsh plants on Saltend Common. On May 15th, another female was found in the same locality. On May 20th, a male was captured on the Humber shore between Hull and Hessle. On May 23rd Saltend was again visited, and in the bright sunshine, the species was observed running about in great numbers on the saltmarsh plants, both at this point and on the 'growths' of the Humber shore, between Marfleet Creek and Lord's Clough. On May 29th, an example of each sex was taken on the shore, between Hull and Hessle. On June 13th, a single female was captured on the clay at the Kilnsea end of the Humber side of Spurn It seems probable, therefore, that the species occurs on the Yorkshire Humber shore from Spurn to Hessle, and possibly further west. It would be interesting to learn whether it is to be found on the Lincolnshire side of the estuary.

The form *purbeckensis* was described and figured by F. O. P. Cambridge in the 'Annals and Mag. of Nat. Hist.' Ser. 6, Vol. XV., p. 32, and has been found at Poole Harbour and other localities in the south. The var. *minor* is also described by F. O. P. Cambridge in the same journal, and was first taken in April on the shores of the Solway. The species has also been recorded from Northumberland.*

Lophomma subæquale Westr. A single female of this rare species was captured on Saltend Common on September 8th.

Araeoncus humilis Bl. was found on the Humber Bank, between Hull and Hessle, on May 29th, 2 males and 8 females in all being captured.

Cornicularia kochii Camb. As mentioned previously, this is an addition to the British List. The first male specimens taken in this country were found on the Hull Society's excursion to Barton, N. Lincs., on April 17th. The first Yorkshire example was afe male found on the foreshore at Saltend in May. The male was found in Yorkshire for the first time on 'the shore between Brough and Ferriby, on the 22nd August, when two specimens were taken. A further male was captured at Saltend on September 18th.

SPURN.

From Spurn the following are additions to the previous list :

Prosthesima latreillii C. L. Koch. An adult female and immature examples of both sexes were found on June 13th. They occurred at the roots of the grasses on the sand dunes, their jet black hue making them very conspicuous against the yellow surroundings. This is a new record for the county.

Lophocarenum nemorale Bl. This, also a new Yorkshire record, occurred commonly, under drift seaweed on the Humber side of the headland, on May 30th ; female specimens only being taken.

Prosopotheca monoceros Wid. A female of this species was found at Spurn on the 13th of June.

Europhrys aequipes Camb. Mr. Falconer describes this as an excellent addition to the Yorkshire list. Examples of both sexes were taken.

HOLDERNESS.

(1) From the marshes of Holderness the following new records have been obtained :—

Leptyphantes pallidus Camb. A female was taken on the

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* 'Naturalist,' Apr. 1902, p. 115.

Sutton Drain Bank on May 14th, and another female was obtained on a visit to Tunstall in the following month.

Baryphyma pratensis Bl. On May 5th a female of this species, an addition to the Yorkshire list, was taken on the Sutton Drain Bank, near the Bridge on the road between Sutton and Wawne.

Pulfin Bog, on the River Hull near Beverley, which is noted for some rare plants, has also yielded three additions to our list of local spiders, viz. :—

Tmeticus expertus Camb. 2 females were taken on July 7th.

Gongylidium distinctum Sim. On the same date a single male of this species was found. It is the only example yet taken in the county.

Lycosa herbigrada Bl. One male was taken running about among the marsh plants.

(2) The WOLDS of Holderness have added three species new to our list. These are :—

Clubiona terrestris Westr. An example of each sex was taken in Birkhill Wood, near Cottingham, on June 5th. On October 16th, one male and five females were obtained in a beech wood at South Cave.

Microneta conigera Bl. On June 5th two males of this spider were captured in Birkhill Wood.

Styloctetor penicillatus Westr. A female was taken in Birkhill Wood on June 5th.

Tmeticus abnormis Bl. A single male was found among dead leaves in a large beech wood near South Cave, on October 16th, 1909.

Leptyphantes tenebricola Wid. Of this species a male was captured in a wood near South Cave on July 5th.

Prosopotheca monoceros Wid. A male was taken on October 16th in a beech wood near South Cave.

In a garden in Hull, a male *Attus pubescens* Fabr. was obtained on the 28th of June.

DERWENTLAND.

On the Yorkshire Naturalists' Union Excursion to Market Weighton, on May 8th, 3 species were added to the local list, viz. :—

Cnephalocotes obscurus Bl. A female was found among heather on the road to Holme-on-Spalding Moor.

Wideria cucullata C. L. Koch. In the same place a female of this species was also taken.

Hasarius falcatus Bl. Examples of this spider were also found among the heather.

FIELD NOTES.

BIRDS.

Crossbills in Durham.—The Crossbills, in their somewhat more than ordinary migration to England this year, were first noticed in a wood in the East of the County of Durham, in the last week of June (1909). By the middle of July they were pretty frequent in the Wear Valley, near Durham and Wolsingham, and in the last week of the same month, were noticed in the woods in the Upper Browney Valley, feeding on the green cones of the larch. At the same time they were in the Derwent Valley, and also over in Hexhamshire in Northumberland.—J. W. Fawcett, Saltley, Towlow, Co. Durham.

Common Scoter at Doncaster.—On Saturday, September 18th, at about 8-30 p.m., when near the Town Moor, Doncaster, I heard ducks flying overhead, their call notes being unfamiliar to me. On the following Monday, on telling Mr. Phillips about them, he said that he had been shown a duck that had been found wounded near the place where I had heard them, and that it was a Scoter. On the 21st inst., I obtained the bird from its captor, and found it to be an adult male Common Scoter, in good plumage. It has been set up for the Doncaster Museum. The middle of September is a remarkably early date, and Doncaster a remarkable locality for such a marine species.—H. H. Corbett.

Cream-coloured Variety of the House Sparrow.—The keeper from Cusworth a few days ago brought me a very interesting Sparrow. The wings, tail and sides of the neck are very pale cream colour ; throat and side of head, under parts and back fawn colour, fading to pale cream colour.—H. H. Corbett, Doncaster.

Glossy Ibis near Doncaster.—On Wednesday, October 27th, I saw a Glossy Ibis exposed for sale along with other wild fowl, in a game-dealer's shop. I learnt from the shopkeeper that it had come in that day from Misson, near Bawtry. It is a young bird, with the head and neck spotted. It is being set up for the Doncaster Museum.—H. H. Corbett, Doncaster.

Glossy Ibis at Whitby.—A remarkably fine specimen of the Glossy Ibis was shot on the Old Hall Farm, Ruswarp, near Whitby, on October 20th. The place where it was shot is a quiet sheltered marshy spot (about a mile from the sea), where it had frequented for some days. It was an adult bird in winter plumage, the sex, unfortunately, not being ascertained. The specimen was secured by the Whitby Literary and Philosophical Society, and the skin has been preserved and mounted for the Whitby Museum.—THOS. STEPHENSON, Whitby.

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COLEOPTERA.

Atomaria fimetarii Herb. at Doncaster.—This somewhat rare beetle has been found in considerable numbers in *Coprinus comatus* here this September. It does not seem to have been recorded for the West Riding previously, but it is interesting to note that the late W. C. Hey took it at York in the same species of fungus some years ago.—H. H. CORBETT.

Leistus montanus on Skiddaw.—In the 'Transactions of the Carlisle Natural History Society for 1909' it is stated that *Leistus montanus* Steph. has not been taken recently on Skiddaw. I have therefore pleasure in recording that on August 5th, 1909, I took eight specimens of this rare beetle under stones on Skiddaw summit. They were fairly abundant, and only lack of time prevented the capture of a larger number. My identification has been confirmed, with his usual kindness, by Mr. E. A. Newbery. *Nebria gyllenhalii* Sch., swarmed in the same spot—G. B. WALSH, Middlesbrough.

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LEPIDOPTERA.

Abundance of *Scoparia conspicualis*.—Last August, my brother, Mr. J. A. Butterfield, shewed me a specimen of *Scoparia conspicualis*, which he had taken in Bolton Woods, and I may add that the species has been unusually abundant this year in this district. On a single tree trunk I counted about twenty individuals.—E. P. BUTTERFIELD, Bingley.

—: o :—

HYMENOPTERA.

Sirex noctilio (= **S. juvencus**) is a rare insect in the Louth District. It is therefore of interest to record that on October 7th, while looking over a collection of natural history objects, made by the children of Rev. Geo. Hall, Ruckland Rectory, my attention was drawn to a male and a female, *S. noctilio*, which the children had recently caught in the Rectory grounds.—C. S. Carter, Louth.

Sirex gigas has been not uncommon in South West Yorkshire, and elsewhere this year, judging from the reports and specimens brought to me, but I have not seen *noctilio*. *S. juvencus* is distinct from both species, but most, or all, of the old records of *juvencus* refer to *noctilio*.—G. T. Porritt.

—: o :—

MOLLUSCA.

Milax sowerbyi in Grimsby.—When walking down Ainslie Street, Grimsby, about 10-30 a.m. on the 17th October, near a grass enclosure, I noticed a number of slime tracks on the pavement. From one of them I picked up a slug, which proved to be *Milax sowerbyi*. This species has not been previously recorded for the Grimsby District (Division 4).—C. S. Carter, Louth.

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GEOLOGY.

Plants from the Peat.—At a recent meeting of the Hull Geological Society it was announced by Mr. W. H. Crofts, that he had obtained a portion of a seed pod of the Iris (*I. pseudocorus*) from the peat exposed during the excavations for the dock at Immingham, North Lincolnshire. At the same meeting Mr. J. F. Robinson exhibited a well-preserved seed-pod of the March Pea (*Lathyris palustris*) from the peat exposed during the construction of the New Dock at Hull.—T. S.

Shap Granite at Hull.—Mr. Pauley has presented to the Hull Museum a fine Boulder of Shap Granite obtained from the Boulder Clay exposed during the construction of the new Joint Dock at Hull, at a depth of 20 ft. from the surface. It is sub-angular in shape, and measures 16 inches × 14½ inches, and is 3 ft. 8 ins. in greatest circumference.—T. S.

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A contemporary figures a 'tame wild' lizard!

A certain natural history magazine is getting conscientious. We learn under 'Answers to correspondence' that 'No queries have been sent in *so no replies can be published*!'

We learn from the report of the Committee of the British Association appointed to determine the *precise signification* of topographical and geological terms used locally in South Africa, that Poortje=a little poort. We don't quite know what a 'little poort' is, unless it is what a geologist asks for when he is Gouph (pronounced 'cope') 'a Bushman word, meaning as dry as can be.' We notice that a Yorkshire geologist is the Chairman of this Committee.

REVIEWS AND BOOK NOTICES.

The Green Algae of North America is the title of an elaborate and carefully compiled memoir by Mr. Frank Shipley Collins, issued by the Tufts College, Mass. It is illustrated by numerous plates, and is a very creditable piece of work.

The Old Cottages of Snowdonia, by **H. Hughes** and **H. L. North.** Bangor: Jarvis & Foster. 75 pp., 3/6 net.

Most visitors to north-west Wales must have been struck with the variety and beauty, yet simplicity, of the Welsh cottages. The authors of this book have the advantage of a knowledge of architecture, and are keen draftsmen, consequently their numerous sketches of exteriors and interiors, with details of doors, etc., as well as plans of the buildings, are of permanent value. Their descriptions are charmingly written, and it is clear that they are faithful disciples of William Morris. *Simplicity* is the greatest lesson taught by the study of these cottages. The volume is in every way well produced.

The Norfolk and Suffolk Coast, by **W. A. Dutt.** T. Fisher Unwin. 413 pp., 6/- net.

This is one of 'The County Coast Series,' and is an admirable and charming guide to that exceptionally interesting coast between Kings Lynn and Ipswich. The author has the advantage of being personally familiar with the places about which he writes, which is an advantage! His work amongst the pre-historic and later antiquities also enables him to speak with more accuracy than usual with regard to the various relics of the ancient country with which he deals. He also refers to coast erosion, local history, natural history—in fact, practically everything than an educated visitor is likely to wish to know. The book is admirably illustrated, many of the views having been carefully selected; these alone give quite a Dickensian tone to the volume. There is a good index, and the price is very reasonable.

Old English Towns, by **William Andrews.** London: T. Werner Laurie. 238 pp., 6/- net.

In this the late William Andrews has written an account of the principal features in connection with twenty-seven of the old towns of this country. The exigencies of space prevent more than a very meagre summary of the history of each place; and the author has evidently given more prominence to 'curious' information than to a really sound and scholarly history of the places dealt with. He has also had no idea of proportion; the account of an old miracle play at Hull (where the author lived) taking up almost as much space as that devoted to the entire history of Leeds—a city which 'is certainly not an attractive place!' The book, however, is probably not written for the serious student, but rather to help to pass a few hours in the hands of those who like to know a little of the past history of our country, and it will serve this purpose well. It is not too technical, and the illustrations are very well chosen and well reproduced.

The Mineral Kingdom, by **Dr. R. Brauns,** translated, with additions, by **L. J. Spencer.** London: Williams & Norgate.

It is a pleasure to draw the attention of geologists, collectors, teachers and others to this admirable publication, which is being issued in twenty-five parts at 2/- net each, seven of which have already reached us. We hope to refer to the work again on its completion, but in the meantime we can say that it is by far the finest of its kind on the market, and it is certainly the cheapest. The coloured illustrations of minerals, usually so difficult to reproduce with any degree of accuracy, are very fine, the colours and even the metallic tints being perfect. There are to be ninety-one of these plates in the complete work, which is 4to in size, and will have 440 pages, with nearly 300 illustrations in the text. The fact that large editions have already appeared in German, Russian, Italian and Bohemian, speaks well for its popularity, and English readers are to be congratulated that the work now being issued is in the capable hands of Mr. Spencer of the British Museum. Several British minerals are figured.

Woz'ls, by **J. Carlill.** Hull: A. Brown & Sons. 118 pp., 1/- net.

We learn that 'the contents of this book is copyright'; nevertheless, it contains a number of exceedingly humorous and original stories in East Yorkshire dialect. They refer to aspects of village life, and each one has a moral. There is a useful glossary.

The Origin of Vertebrates, by **Walter Holbrook Gaskell.** Longmans Green & Co. 537 pp., 21/- net.

Amongst the wealth of literature now being produced under the head of 'Natural Science,' there now and then appears a volume which is a distinct and original contribution to science, which contains the honest and detailed researches of a truly qualified writer, and one which, whether the whole of the theories therein propounded are accepted or not, takes a permanent and prominent place in the great structure of Truth, which all scientific workers are, or should be, helping to erect. Such a volume was Bower's 'Origin of a Land Flora,' recently noticed in these columns. And side by side with it, and occupying a similar position, is 'The Origin of Vertebrates,' recently published. It is twenty years ago since Dr. Gaskell, as a result of his work in the physiological laboratory at Cambridge, produced the first of a lengthy series of papers dealing with this question, but these do not appear to have been either supported or condemned; in fact, criticism of the question seems to have been withheld. Dr. Gaskell therefore now brings forward his theory in a volume, and we trust that his honest and laudable desire, viz., that it shall be discussed and criticised, and any flaws in his arguments exposed, will be carried out. The matter, however, is not one which will be accepted or rejected in a short time. In the first place, the number of specialists who are qualified and able to deal with the matter fully, is not large. But unquestionably as time goes on, workers will consider the theory on its merits, and whilst we should not like to say that all Dr. Gaskell's conclusions will be accepted, he will doubtless have the satisfaction of finding that his work is appreciated, and that he has most substantially contributed towards this fascinating and important subject.

During his investigations, the author states that he could not help being struck by the force of the comparison between the central nervous systems of Vertebrata and Appendiculata as put forward again and again by the past generation of comparative anatomists, and wondered why it had been discredited. There in the infundibulum was the old œsophagus, there in the cranial segmental nerves the infraœsophageal ganglia, there in the cerebral hemispheres and optic and olfactory nerves the supraœsophageal ganglia, there in the spinal cord the ventral chain of ganglia. But if the infundibulum was the old œsophagus, what then? The old œsophagus was continuous with and led into the cephalic stomach. What about the infundibulum? It was continuous with and led into the ventricles of the brain, and the whole thing became clear. The ventricles of the brain were the old cephalic stomach, and the canal of the spinal cord the long straight intestine which led originally to the anus, and still in the vertebrate embryo opens out into the anus. Not having been educated in a morphological laboratory, and taught that the one organ which is homologous throughout the animal kingdom is the gut, and that therefore the gut of the invertebrate ancestor must continue on as the gut of the vertebrate, the conception that the central nervous system has grown round and enclosed the original ancestral gut, and that the vertebrate has formed a new gut did not seem to him so impossible as to prevent his taking it as a working hypothesis, and seeing to what it would lead.

From this the author takes us on, step by step; each chapter being remarkably clear, and as it is followed by a concise summary, it is possible to easily grasp his meaning. His concluding remarks are:—'Throughout, from the dawn of animal life up to the present day, the evidence given in this book suggests that the same law has always held. In all cases, upward progress is associated with a development of the central nervous system. The law for the whole animal kingdom is the same as for the individual. Success in this world depends upon brains."'

Mr. Alexander Ramsey perseveres with his '**Scientific Roll** and Magazine of Systematised Notes' (Bacteria), No. 24 of Vol. II. of which has recently been published. 'The Scientific Roll' is a classified bibliography as elaborate as that being conducted by the Royal Society, as detailed as that of the 'Concilium Bibliographicum' of Switzerland, and in bulk (so far as its MS. condition is concerned) greater than that of the 9th and 10th editions of the 'Encyclopædia Britannica.'

In part 35 of Cassell's excellent **Nature Book** a writer on 'Fossils and their Story' is evidently more familiar with his camera than his hammer. His first illustration is of Gryphea [sic.] incurva, 'shewing operculum,' there is a 'fossil sponge in flint chalk'; a Gault Ammonite figured as 'fossil Nautilus'; he cannot spell Hugh Miller's name correctly; Strophomena is 'a Brachiopod Shell Fish'; and Lias Limestone with gryphœas is called 'gryphite' limestone. As photographs, his illustrations are excellent.

The Home-life of a Golden Eagle. By **H. B. Macpherson.** London: Witherby & Co. 44 pp. and plates. 2/6 net.

Messrs. Witherby & Co. know how to produce an attractive book, and the reproductions of the thirty-two photographs by Mr. Macpherson, mounted on tinted paper with wide margins, certainly are all that can be desired. Judging from the plates, the author might almost have lived in a hut within a couple of yards of the eyrie, and taken repeated snap-shots from the time the eggs were laid to the flight of the young bird. We never remember seeing a more complete series of photographs of bird life—they are truly remarkable. How they were secured can be ascertained by reading the pages of letterpress. In common with most bird-photographers, Mr. Macpherson gives accounts of his dangers and escapes from death. They all escape.

Studies in Fossil Botany, by **Dr. Dukinfield H. Scott.** Second Edition. Adam and Charles Black. 1909, 683 pp., 10/6 net.

Some years since at an important conference, one of the members was missing, and was not seen for a whole day and night. The next morning it transpired that he had received Dr. Scott's 'Studies in Fossil Botany,' and had locked himself in his room in order that he might not be lured away from it. That was eight or nine years ago, and since then a whole army of workers has been contributing much useful information relating to the structure and affinities of fossil plants. Dr. Scott's 'Studies' were founded on a series of lectures delivered at the University College, London, and in their present form they embody all the discoveries since made. They are essentially concerned with the morphological and evolutionary aspects of Fossil Botany, in connection with the study of which such great strides have been made in recent years. Dr. Scott's essays are illustrated by over two hundred blocks from micro-photographs and drawings; some of the latter being by Mrs. Scott. Students of this fascinating branch of palæontology are fortunate in having one so capable as Dr. Scott to present the views of recent investigations in such a readable and scholarly form. There is an excellent index, and the price of the book is very reasonable.

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We regret to learn of the death of J. Ogden, the President of the Ovenden Naturalists' Society.

The report of the excursion of the Yorkshire Geological Society to Lincolnshire, which appeared in the *Yorkshire Observer* has been reprinted locally.

At the Annual Exhibition of the Royal Photographic Society of Great Britain in the New Gallery, Regent Street, W., the Yorkshire Naturalists' Union was strongly represented, the following members having had pictures accepted and hung in the Scientific Section:—R. Fortune, 5; T. Roose, 4; G. A. Booth, 3; W. Wilson, 2; J. Atkinson, 1; Digby Ledgard, 1. As about five times the number accepted are rejected each year, these gentlemen are to be congratulated upon their success.

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The **Annual Report of the Huddersfield Natural History and Photographic Society** (1909. 8 pp.), 1ontains a record of the year's work, together with brief natural history records by C. Mosley (Lepidoptera) ; E. Fisher (Ornithology) ; W. E. L. Wattan (Botany) ; and T. W. Woodhead (Geology). From the librarians' report we learn that nine books were not returned *as per rule.*

We have received the '**Birmingham Natural History and Philosophical Society** List of Members, 1909, and Annual Report for the year 1908' (Coventry, 48 pp). This is a useful record of the Society's fiftieth year's work, and of the work of its various sections. 'Expenses attending dinner in celebration of Fiftieth Anniversary, £9 5s. 1d.' would seem to indicate that 'attending dinner' is rather a serious matter in Birmingham !

The **Transacitons of the Hertfordshire Natural History Society and Field Club** (Vol. XIV. pt. 1) contains a valuable series of papers on Hertfordshire geology, archæology and natural history. The late Sir John Evans describes some palæolithic implements ; Mr. Kidner has a paper on the Chalk, and there are articles on birds, insect and fungus peats, lepidoptera, soils, etc. ; and the editor, Mr. John Hopkinson, has an exhaustive meteorological report. Of particular interest to northern naturalists is Canon Norman's Presidential Address on 'The Celtic Province : its Extent and its Marine Fauna.' The Editor is to be congratulated upon the excellent list of contributors. We notice the new President is a Yorkshireman, Mr. George Lamplugh, F.R.S.

The Bradford Antiquary, N.S., part 13. 1909. 2/6 net.

Bradford people are proverbially religious, and we naturally expect to find (and are seldom disappointed), papers dealing with old churches, chapels and parsons in antiquarian publications emanating from Bradford. The 'Bradford Antiquary' is no exception, but in addition there are interesting articles on old Bradford and old Shipley maps, a Bradford artist (a Hull man !), place names, Cheldis, Clapham, and the Bradford Manor Court Rolls, etc. There is also an appreciative notice of the late Charles A. Federer. The contributors are Messrs. H. Speight, L. Dawson, J. A. Clapham, T. T. Empsall, H. E. Wroot, W. Scruton, B. Wood, W. E. Preston, J. H. Rowe (Editor), and Miss Tempest. This interesting publication also contains the first part of a Transcript of the Marriage Register of Bradford.

Transactions of the Hull Scientific and Field Naturalists' Club, Vol. IV., Part II., 1909 (pp. 55-114 ; plates II.-IX.). Price 2/-.

This Society continues to give proof of its vitality in both the characteristics connoted in its title. This, the latest issue of its Transactions, covers the years 1907 and 1908. It is in no way inferior to the earlier numbers, and in common with them is notable for the wide field covered by the observations it records, and especially so for those in departments of Natural History which are rarely taken up by members of Natural History Societies. Articles on Palæontology, Geology, Botany, Arachnida, Mollusca, and Diatomaceæ, compete for special mention, and all deserve it. Some of them have seen the light, or been noticed in 'The Naturalist' previously. They are none the less welcome in this collected form, showing, as they do, the sum of work done in a restricted area, partly in Yorkshire and partly in Lincolnshire. Different tastes are all catered for. The Naturalist will view with pleased surprise the excellent list of East Riding Arachnida, compiled, and for the most part collected, by Mr. Stainforth. The reader with Antiquarian or more general tastes, will be attracted to the excellent series of seven plates with full descriptive letterpress by Mr. Sheppard, of a collection of Roman and other antiquities found at South Ferriby. Those of a literary or poetic turn will be gratified to find a beautiful 'In Memoriam' sonnet over the well-known initials, 'E. L.' Emphatically a publication which entitles the members of the Hull Society to feel satisfied that real work is being done under its auspices, and should stir up other Societies to emulate the example it sets.—E. G. B.

NEWS FROM THE MAGAZINES.

The Belfast Museum Publication, No. 19, is ' A Catalogue of Spinning Wheels and Accessories ' (illustrated and sold at one penny).

A remarkable photograph of a ' Skull of the great Irish Deer ' appears on page 17 of the useful *Quarterly Notes No.* 14.' issued by the Belfast Museum. It is the first skull we have seen that has a distinct hybernian *expression.*

Mr. R. Lloyd Praeger points out (*Irish Naturalist*, November), that a specimen of *Spiranthes gemmipara* recorded in a natural history weekly, and, of course ' [properly identified.—E.K.R.]' turns out to be not a new record, but *Epipactis palustris* !

In the *Bradford Scientific Journal* for October, there are many interesting notes. Mr. Cuthbert Hastings describes ' Gaping Ghyll ' ; Miss M. A. Johnstone writes on ' A Fossil Stump ' ; Mr. H. B. Booth describes ' the Summer Migrants ' ; and Mr. F. A. Lees writes on ' The Lees Herbarium and Library at Bradford.'

The *Irish Naturalist* gives the following sample from one of Uncle Westell's books :—' Creatures who are famous for their hunting powers, creatures who, possessing sharp teeth and sharp claws (known as the law or correlation, and for information upon which we are very largely indebted to the French Naturalist, Curvier), live by means of stalking and tearing to pieces their prey.'

Mr. G. T. Porritt records that of the only two specimens of *Abraxas varleyata* he bred this year, the produce of seven hundred collected pupæ, one has both the left-side wings male, *i.e.*, with the usual white rays characteristic of the sex, but the right-side wings female, *i.e.*, without white rays, as is usual in that sex. Apparently it is a gynandrous specimen. (*Entomologist*, October).

British Birds for November contains an account of its scheme of marking birds by means of numbered rings. During the year, 4750 rings have been issued, 2200 of which have been used. Of these, some thirteen seem to have been recovered, nearly all near the places where the birds were ringed ; one being found ' dead in nest,' so had not got far. Probably better results will be reported next year.

Mr. Cuthbert Hastings has been pot-holing, and gives his experiences in a contemporary. On Great Shunner Fell, he was told of a pot hole that had *no bottom*, and another near by was *still deeper.* Investigation shewed that the deepest was under twenty-three feet. He went to investigate a cave near Grassington, which a dalesman assured him he had followed for a very long distance, and that a friend of his had gone much further. Investigation shewed that the actual distance that *could* be followed was *five yeards* [sic.]. We learn that a Yorkshire Anglers' Club has started pot-holing.

Mr. Edward Mitford of Hunmanby Vicarage, in *The Field*, Nov. 6th, records the shooting of a specimen of the Glossy Ibis at Hunmanby on Oct. 15th. The plumage of the head and neck indicates an immature bird. The measurement between the tips of the outstretched wings is little over 3 ft. There were two others observed at the same time, one of which was seen again. Mr. F. Boyes writes in the same journal for Nov. 13th, that he has reason to believe a Glossy Ibis frequented for a few days a wet pasture field near their river. The description was given by to him by a shooter, a reliable man, who knows most birds which frequent the river side.

CLASSIFIED INDEX.

COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators, the actual titles of papers not always being regarded so much as the essential nature of their contents.

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Page 162, line 29, *for* " Corwentz," *read* " Conwentz."
,, 189, line 9, *for* " C. Stevensonii," *read* " Collybia Stevensonii."
,, 204, line 22, *for* " Shipton " *read* " Skipton."
,, 222, line 5, *for* " No. 1399," *read* " No. 1349."
,, 233, line 1, *for* " W. Robinson," *read* " J. F. Robinson."
,, 233, line 4, *for* " British Isles," *read* " Yorkshire."
,, 253, Omit the fourth line from the bottom, and read :—
" This explains the scar of leaf (F1) encircling," etc.
,, 268, line 39, *for* " Bale," *read* " Belt."
,, 339, line 46, *for* " vertical," *read* " vortical."
,, 346, line 20, *for* " Limestone," *read* " Grit."
,, 360, line 3, *for* " 1908," *read* " 1909."
,, 401, line 26, *fos* Brimscar," *read* " Grimscar."
,, 401, line 30, *for* " banded," *read* " handed.',
,, 443, line 19, *for* " pseudocorus,', *read* " pseudacorus."
,, 443, line 23, *for* " Lathyris" *read* " Lathyrus.'

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